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1874

PATHOLOGICAL OBSERVATIONS

ON THE

ROTATED OR CONTORTED

SPINE,

ETC.

PATHOLOGICAL OBSERVATIONS
ON THE
ROTATED OR CONTORTED
SPINE,

COMMONLY CALLED
LATERAL CURVATURE,

DEDUCED FROM PRACTICE.

IN WHICH ARE SHewn

THE CAUSES THAT PRODUCE IT ; THE REASON OF ITS BEING
MISTAKEN FOR AN INCURVATION OF THE SPINAL COLUMN ;
AND THE MEANS BEST ADAPTED TO ITS PREVENTION AND
CURE ; AGREEABLY TO THE PRINCIPLES LAID DOWN, AND THE
AUTHOR'S EXPERIENCE.

BY

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LATE OF EDINBURGH, AND SURGEON IN THE ROYAL NAVY.

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1824.

TO

SIR ASTLEY COOPER, BART. F.R.S.

SURGEON TO THE KING.

ETC. ETC. ETC.

THESE OBSERVATIONS,
INTENDED TO ILLUSTRATE THE PATHOLOGY,
ARREST THE PROGRESS,
AND FACILITATE THE CURE OF
DEFORMITY IN THE SPINE,
ARE DEDICATED, WITH PERMISSION,
AS A TRIBUTE
DUE TO HIS DISTINGUISHED PROFESSIONAL
EMINENCE, AS WELL AS PRIVATE WORTH,
BY HIS RESPECTFUL
AND OBEDIENT SERVANT,
THE AUTHOR.

G, NORTHUMBERLAND BUILDINGS,
BATH, JAN. 2, 1824.

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ERRATUM.

Page 116, line 9, *for læsion read lesion.*

PATHOLOGICAL
OBSERVATIONS,

ETC.

SECTION I.

INTRODUCTORY OBSERVATIONS ON THE ROTATED OR
CONTORTED SPINE.

THERE are few diseases incident to mankind, that have not undergone, at one period or other, a medical investigation; and it is chiefly to the result of such investigation, recorded and handed down to us through the lapse of ages, that so many can now be mitigated in their virulence, and the sufferings of the afflicted, in so many instances, be so happily relieved. But, notwithstanding the means thus afforded us in alleviating the sufferings of our fellow-creatures, amidst the many conflicting diseases which daily assail them, we have to regret, that there yet remain a great number which have eluded the research

of the most discerning and able of the profession; and of these, none can, in justice, be said to hold a more conspicuous place, than that which forms the subject of the present observations. For although much attention has been paid (more especially of late years, on account of its frequency) to the investigation of this deformity, yet I may safely say, that it has resisted, in the majority of cases, every means hitherto proposed, both for its prevention and cure. In support of this assertion, no other or better proof is needed, than the numberless objects themselves, who are now every where seen to crowd the different walks of life, and who are increasing upon us in a most frightful degree: and to these I would add as many more, who, labouring under all the miseries of this affliction, are cloistered within the precincts of their own dwellings, and never meet the public eye.

That distortion of the spine, in whatever shape it may exist, is not a light evil, and consequently requires our most serious consideration, I think every day's experience must teach us; even the slightest is often grievously felt by the unfortunate sufferer. Independent of the *mauvaise honte*

which must ever haunt the mind of those who carry this deformity with them into all societies, it never fails to incapacitate them, in some degree, for the varied pursuits of life ; it frequently causing them to seek that employment the least adapted to their ability and inclination ; and, in too many instances, rendering them wholly incapable of following any pursuit whatever, as well as in some cases of performing even the common necessities of life. In this deplorable condition, they are doomed to drag out a miserable existence, without the slightest hope of obtaining relief, and to become a burthen, not only to themselves, but to their friends around them, who, in many instances, are little calculated to bear it. And not unfrequently to this helpless condition are added, a train of anomalous diseases and bodily sufferings, the offspring of this deformity, which all the powers of medicine, as well as art, are unable to relieve.

Is it not truly, then, a most melancholy reflection, that a disease like this, so monstrous in its appearance, and fraught with so much danger and distress to the unfortunate sufferer, should rear its head amidst all the boasted advantages of our

medical schools, and continue its unabated ravages amongst the youth of the present age, whilst no effectual check seems yet to have been given to its career? Is this because it is incurable? Or is it because its pathology is not yet sufficiently understood?

From the very frequent appearance of this deformity of late years, particularly amongst the females of this country, it is considered, by many, to be a disease rather of modern than of ancient date; and I think the opinion correct, so far as it regards its frequency: for, excepting gibbosity, or what is commonly called the hump-back, few species of spinal deformity were prevalent amongst the ancients; and for this very obvious reason, that the causes which will be found to produce them, little existed in the earlier ages. At the same time, if we take an impartial view of this subject, I think we shall find that the gibbous, or hump-back, was, in proportion to population, nearly as frequent in former times, as it is at the present day. It is only that particular distortion, therefore, which we find in the young and growing subject, commonly, but, in my opinion, incorrectly called

LATERAL CURVATURE, and which is now by far the most frequent kind of spinal deformity that can at all be considered of modern date; the nature and cause of which, together with the means best suited, both to its prevention and cure, form the chief subject of the present observations.

I shall here take the opportunity of observing, that as I consider gibbosity to be a very different affection, and produced by a very different cause from that which I am now about to treat; and as I shall have frequent occasion to notice it with the view of establishing this difference, I shall beg, in future, to call it the CURVED SPINE, in contradistinction to the other (that which forms the subject of these sheets), which I shall denominate the ROTATED OR CONTORTED SPINE*.

As the view which I have taken of this species of spinal deformity, differs, in one great essential, from that which has hitherto been entertained of it, at least so far as I am acquainted; and as this

* I have adopted the word *contorted*, as a specific term, to distinguish the complaint; and shall use the word *distorted*, in a general sense, to express any deviation of the spine, or other parts of the body, from their natural form.

consequently involves much of the present modes of practice, as well as the means generally resorted to as a preventive, by rendering them questionable, if not fallacious,—I trust, while I am differing in sentiment with others, in respect either to its pathology or treatment, that I may not be considered as warring, maliciously, against former opinions, or condemning, wantonly, a practice, because of its recommendation. Such conduct I deem highly reprehensible, and little calculated to advance our knowledge of disease. My object is not a malevolent one; it is to arrest, if possible, a malady, which, from its increasing frequency, has, with much reason, become the terror of every family in this country.

Ever since I turned my attention, then, to the investigation and treatment of spinal contortion, every day's experience led me more and more to believe, that medical men were in error respecting its pathology: for how is it possible otherwise, to reconcile such opposite modes of treatment, as we find recommended for its cure? We surely cannot reasonably expect the same result from the recumbent posture, as from the use of caustic issues; neither can we look for the same

effects, from carrying a concentrated weight upon the head, as from the powerful extension of collars, neck-swings, and screw-chairs; all of which, however, are both advocated and practised, at the present time, throughout the kingdom, and by men of intelligence and established reputation. Opposite, however, as these practices are to each other, the adoption of all or either of them might be admitted, were they found to answer the end for which they have been proposed; but, alas! how often do we find the contrary? and that patients, after having endured, for a number of years, the galling restraints of iron machinery, or, smarting under caustic issues, have been excluded, for a similar period, by a horizontal confinement from their youthful sports and recreations,—a sacrifice not easily borne with, even under the most certain prospects of recovery,—have the mortification of rising from their couches, in the midst of disappointment, or of throwing off their iron restraints, in the same deformed condition as previously to their adoption; while the practice introduced of late years, of converting our distorted females into the Atlantes of the age, should, in

my humble opinion, be held up *in terrorem*, and forthwith expunged from the records of the healing art.

Many are the means, also, that have been introduced, and continue daily to be practised upon young females, as preventives of this deformity; but, to say the least of them, they are only as many modes of painful restraint, calculated to produce the very opposite effect to that for which they are employed. Some of them are certainly more simple, and apparently less irksome than others; qualities supposed, no doubt, to attach themselves, from their very general introduction now into schools and families, to what are called education chairs; a name, by the by, not inaptly applied to them, if deformity be considered a branch of it: for if a mechanic, stored with all the modern improvements of his art, were to sit down to contrive a machine that would be directly calculated to contort the spines of youth, I doubt whether he would be able, with respect both to simplicity and efficacy, two of the greatest desiderata in mechanism, to produce a more perfect one than we have in these chairs.

Any means, therefore, more effectual in removing as well as preventing contortion of the spinal column, than those which are in daily use, must certainly be held an object of much and great importance to mankind. For it will be found, that whenever the spine has deviated from its natural position, however slight the deformity may be at first, it will always increase, in a greater or less degree, with the age of the patient, should the causes of its production not be counteracted, or removed by some more efficient means than those generally resorted to, whereby life is not only embittered, but too frequently cut short, either from the diseases which it occasions, or by impeding some one or other of the vital functions, in consequence of undue pressure. But so desirable an object cannot be reasonably expected, until the real nature and cause of the disease be fully developed. If I shall, in the following observations, therefore, contribute in any way to the elucidation of this point, and be thereby the means of lessening the number of female victims which daily fall a sacrifice to this deformity, at the shrine of fashion, I shall feel that I have done a public

good, and be assured that my labours have not been lost.

The opinion, so long prevalent, that the contorted, like the curved spine, owes its origin to scrofula, seated either in the bones, ligaments, or cartilages of the spine, is a matter, I conceive, of such radical importance in the treatment of this affection, as almost to preclude the hope of its ever being placed within the pale of the healing art; for the cultivation of such an opinion, must ever be a barrier to the adoption of any other means, that have not expressly for their object the removal of this disease; consequently, until some specific be fortunately discovered for the cure of scrofula, contortion of the spine, considered as a scrofulous disease, must remain as much the *opprobrium medicorum* as that which gives it its birth.

I do not by this statement mean to assert, that scrofula is never present in the contorted spine. What I wish to be understood, is, that although I consider the spinal column, and its connecting ligaments, to be as liable to the attack of scrofula, as any other part of the body of similar structure, yet I am of opinion, that

by far the greater number of the distorted spines which we now so frequently meet with, and such as I am now speaking of, owe their origin to another cause, and not to scrofula.

In investigating this important point, it would be as unprofitable to me as it would be uninteresting to my readers, were I to waste my time in sifting the opinions of the ancients, and fill my pages with quotations from their records, to prove whether this affection of the spine, which with them was but of rare occurrence, was considered by those sages to have a scrofulous origin or not. I shall content myself only with the assurance, that such has been the received opinion of many, if not most of my contemporaries, and as it is to them, as well as those who may come after them, that I wish to make known my sentiments concerning this affliction, what remarks I deem necessary to make on this head shall be confined to the opinions of more modern times.

As Mr. Pott's name, from his being the first great agitator of spinal disease in modern times, has appeared in the pages of every succeeding writer upon this subject, and as his opinions

have already been scrutinized to the extreme, I was in hopes I should have been able, out of respect to his memory, to have passed it in silence, but this I feel myself unable to do ; and his name, therefore, must appear in my pages, as well as in those of others ;—not, however, with any wish to detract from his merits, but for the purpose of pointing out the error into which so many have fallen, of attributing the contorted spine to the same disease which he has assigned as the cause of the curved spine, on which he has so ably written.

I cannot, then, but suspect it was much owing to Mr. Pott's publication on the palsy of the lower limbs, as connected with the curved spine, —shewing that this, as well as the altered figure of the column itself, depended upon a scrofulous affection of the vertebræ,—that the opinion that the contorted spine was dependent upon the same disease, became so prevalent amongst medical men. And yet I do not think his observations would in any way justify them in such a digression ; for no author, as it appears to me, has adhered more to his subject, or is less ambiguous, than Mr. Pott.

Mr. Pott was certainly the first, amongst the moderns, who roused the profession from the apathy into which its members had fallen, with respect to a particular species of spinal distortion, which, before his time, had been generally considered as the immediate cause of the attendant palsy of the lower limbs ; and brought them to a just sense of their error. And as he was a man of acknowledged ability, as well as acute discernment, and to whose opinions and judgment the greatest deference was at all times justly shewn, not only on account of his great talent and high medical preferments, but from the many important improvements he had already made in the practice of surgery, it is not at all to be wondered at, that his opinions concerning a disease, which, before his time, had been considered one of those incurable afflictions of the human race, should have been so eagerly received, and universally adopted. But any one who shall sit down in his closet, and read over carefully that part of Mr. Pott's works which treats of the palsy of the lower limbs, cannot, I think, rise but under the conviction that he never intended his observations should be ap-

plied to any other affection of the spine, than that on which he expressly wrote ; and, in order to impress this the more strongly upon the minds of his readers, he more than once, during the course of his arguments, emphatically reminds them of it.

Mr. Pott confines his observations solely to one species of spinal deformity : he confines them to that deformity which is generally known by the name of the hump-back, and which, in pathological distinction, I have called the CURVED SPINE. He says, that in this affection, not only the curvature of the spine, but that the palsy of the lower limbs, which so frequently attends it, proceed from one and the same cause, namely, from a morbid condition of one or more of the vertebræ, and the parts in the neighbourhood ; and that this morbid condition of the vertebræ is that peculiar disease we call struma, or scrofula. He tells us, therefore, that his curative indications are for the purpose of subduing this disease of the vertebræ, as the sole cause of all the mischief, and not for the removal of the curvature of the spine, which, he says, is only a consequence.

Such I understand to be the doctrines of this celebrated surgeon, and such the limits he has

assigned to them. But, with an ardour which so strongly marks the medical profession, in carrying almost every improvement, either in medicine or surgery, beyond the sphere of its operation, these limits of Mr. Pott seem to have been outstepped, and his doctrines made to account for the contorted, as well as the curved spine: whence much false reasoning has been advanced, and many useless and pernicious practices introduced.

I confess there is one part of Mr. Pott's writings which would, in a degree, favour such an application of his doctrines, but, at the same time, there are many others which, I conceive, ought to have much more weight with us, and be considered a better criterion whereby we might form a more correct estimate and judgment of his opinions. The passage to which I allude is certainly a very strong one, and no doubt has had its full weight with many. It is given in the fifth of his summary observations, while speaking of scrofula as being the cause of the curvature of the spine. He says, "that when the ligaments and cartilages of the spine become the seat of the disorder (scrofula) with-

out any affection of the vertebræ, it sometimes happens, that the whole spine, from the lowest vertebra of the neck downwards, gives way laterally, forming sometimes one great curve to one side, and sometimes a more irregular figure, producing general crookedness and deformity of the whole trunk of the body, attended with many marks of ill health.”

This passage certainly would imply, that he considered these lateral distortions of the spine which are now so prevalent, to be the effect of this disease, were we not assured by him in another part, that they have a very different origin. We are not to judge generally of a man’s opinions, from an isolated, or, probably, an inadvertent sentence or paragraph, and to raise a superstructure thereon, to deceive ourselves and mislead others ; but to take the whole train of reasoning conveyed to us in his writings, as the basis of our judgment, and the true meaning of the author. We shall find, therefore, that Mr. Pott has not in any other part of his work betrayed similar sentiments, but rather the reverse, and that he has given us sufficient proof, that he considered these two affections of the spine, the

CONTORTED and the CURVED, to be, in cause and effect, very different from each other. Had any such proof been needed, or had he shewn any doubt upon the subject, then there might have been some excuse for the misapplications of his doctrines ; but at present there can be none in the judgment of any one who will read his reasons for having adopted them.

“ An affecting instance of this distemper,” says Mr. Pott, “ in the person of a very promising youth of fourteen years old, with whose family I was nearly connected, induced me to think more of it than perhaps I otherwise would have done ; and the restoration of the use of his limbs, immediately after a seemingly accidental abscess near the part, engaged my attention still more, and became a matter of frequent, though not very satisfactory contemplation ; I say unsatisfactory, because it served only to increase my doubts, without leading me towards a solution of them. The more I thought upon the subject, the more I was inclined to suspect that we had been misled by appearances, and that a distempered state of the parts forming, or in the neighbourhood of curvature, preceded or accom-

panied it: in short, that there was something predisposing, and that we had probably mistaken an effect for a cause.

“ For these suspicions, I had the following reasons, which appeared to me to have some weight:—

“ 1st, That I had never seen this paralytic effect on the legs from a malformation of the spine, however crooked such malformation might have rendered it, or whether such crookedness had been from time of birth, or had come on at any time afterwards during infancy.

“ 2d, That none of those strange twists and deviations, which the majority of European women get in their shapes, from the very absurd custom of dressing them in stays during their infancy, and which put them into all directions but the right, ever caused any thing of this kind, however great the deformity might be.

“ 3d, That the curvature of the spine, which is accompanied by this affection of the limbs, whatever may be its degree or extent is at first almost always the same, that is, it is always from within, outward, and seldom or never to either side,” &c.

What then is the inference to be drawn from these reasons? Is it not that Mr. Pott considered these deviations from right shape, the *CONTORTED SPINE*, to differ both in cause and effect from the *CURVED SPINE*, that on which he treats? And does it not appear from them also, that it was to point out this difference that he expressly wrote? Mr. Pott was too acute an observer, and possessed too much discrimination and judgment to have advanced such definite reasons as the above for adopting his opinions, had he in the slightest degree conceived, that these affections partook either of the same nature, or originated from the same cause. Indeed, had he considered them to have had the same origin, his doctrines must have fallen to the ground after such an exposition; unless it were possible for us to suppose as well as himself, that scrofula when it attacks the *vertebræ* is regulated entirely in its effects upon these bones and the spinal marrow and nerves which they contain, just according to the direction in which the column gives way. And yet it savours much of such an absurdity to tell us, that when the *vertebræ* become softened by scrofula, or the softer epithet *scrofulous* dia-

thesis, they are unable to sustain the superincumbent weight of the body, and are crushed downwards, therefore, by an *overwhelming burthen*. Why in the nineteenth century, our female fashionables, because they are such, should have softer back-bones and heavier heads than those of former ages, is, to me, quite incomprehensible; and yet this would seem to be the case if we argue upon the above principle. For where now is to be found the young lady of fashion, who on becoming such, does not get more or less contorted in her spine, since all those differences in the size of young ladies' shoulders are but lesser degrees of this malady? I rather think this will appear, then, to be fallacy, and the real cause of our contorted spines be found to depend upon the fashionable modes and customs of the day. We may possess a crooked soul, but a deformed body is generally of our own acquiring! But more of this hereafter.

Mr. Pott then, it appears, was of opinion that the contorted spine was occasioned, in women, by the absurd custom of dressing them in stays during their infancy, and, consequently, differed from the curved spine in its never being at-

tended with paralysis of the lower extremities, so far as he had observed : and it must be admitted that his opportunities were not few. This amounts to the same thing as if he had said, that he believed the one to be a scrofulous disease, and the other not : for it is not consistent to suppose, that the majority of European women should be affected with scrofulous vertebræ, so as to produce curvature laterally, with scarcely an instance of paralysis occurring amongst them, while so few who are attacked with scrofulous vertebræ, producing curvature backwards, escape without it.

In fine, Mr. Pott's opinions appear to me to be perfectly correct, as they regard both the curved and the contorted spine, while those of succeeding writers have only tended to confound the two complaints.

No better description has ever been given, nor do I suppose ever will be, of the curved spine, and its attendant paralysis of the lower limbs, than that which has emanated from the pen of Mr. Pott : and he is not in my opinion to be in the least censured, because he has confu-

ed his observations solely to this complaint; or his remedy condemned, because of the unsuccessful issue of its injudicious application, in other species of spinal deformity, for which it never was intended.

While Mr. Pott has put us in possession of such admirable and correct views of the nature of the curved spine, he has, I am sorry to say, left us destitute of any notion which he may have entertained of the contorted spine, farther than that he considered it to be produced by females themselves in the wearing of stays during their infancy.

Since the time of Mr. Pott, therefore, several works have been expressly written upon this subject, and opinions respecting it dispersed through others, with the view of filling up the blank which their authors, no doubt, conceive has been left by Mr. Pott concerning this species of deformity. Different views, consequently, have been taken of it by different authors, but they all seem to agree in this particular, that structural disease of the vertebræ, their ligaments or cartilages, constitutes a principle feature of

the affection : for even those who attribute much of its production to muscular contraction, are of this opinion. Mr. Baynton, for instance, lays his patients down to take off the superincumbent weight of the body, and allow the softened vertebræ to become consolidated. Mr. Wilson, the great supporter of Mr. Grant's opinions, late of Bath, of its being a muscular disease, and from whom, he says, he first derived the hint in an accidental conversation which he had with him, is also of the same opinion. But his and his preceptor's *modus medendi* is very opposite to Mr. Baynton's : for instead of allowing the scrofulous, or, according to him, the ricketty vertebræ to be released from the superincumbent weight, as Mr. Baynton recommends, he, on the contrary, adds to it, by placing on the head an additional weight of several pounds of old iron, or such like, put into an inverted footstool, with which the patient is made to march to and fro, until she, I had almost said, sinks under her burden. For such I recollect were the words of one of my patients, while she was relating to me the mournful tale of her once having been made

the subject of such an oppressive expedient*. Mr. Lloyd likewise favours the notion of its being dependent on scrofula, and this he does in the plainest terms. His words are:—

“ It appears to me that there are two species of curvature of the spine depending on scrophulous disease ; one occupying only a certain part, and being, generally, from within outwards, and what is known by the term *ANGULAR CURVATURE* ; the other occupying a large part, or the whole of the spine, and being, generally, from side to side, and what is, therefore, known by the term *LATERAL CURVATURE*. In the former, there is always some destruction of some portion of the vertebral column, and often, for a considerable time, progressive destruction of bone, cartilage, and ligament ; and the vertebræ undergo precisely the same changes as the extremities of other bones in scrophulous diseases of the joints ; in the latter, there is no destruction of parts, but

* It appeared in this lady's case that she was made to exceed the limited time recommended by Mr. Wilson, which he says should not be more than ten minutes.

merely an alteration of structure.” And further he says :—

“What is the direct cause of this peculiar curvature, and of the wasting of the muscles which always attends it, in a greater or less degree, it is impossible for me confidently to assert; but I believe the following will be found to be the most accurate explanation. It has been supposed by some authors, that the cause of the curvature is entirely in the action of the muscles, but, although this may be, and most probably is, the *immediate* cause, I am much inclined to believe that the *primary* cause is in the vertebræ: that scrophulous action is set up in them, which increases their vascularity, and softens their texture, or, in the language of the old physiologists, diminishes the density of their fibres, relaxes their ligaments, and perhaps loosens their connexions, so that the whole spine becomes weakened;” and so forth*.

But I shall not waste my reader's time, in quoting the many authors who believe it to depend upon structural disease of the vertebræ; nor does

* Lloyd on Scrophula, pp. 214. 234.

it matter whether this be scrofula or rickets, for we just know as much about the one as we do about the other. I shall briefly state what appears to me to be the present prevailing opinion amongst medical men, taken collectively.

I believe it, then, to be the generally received opinion, that, in consequence of scrofula, or the scrofulous diathesis, as it is called, and, according to some, of rickets seizing upon the vertebræ of the spine, their connecting ligaments and cartilages, the column becomes thereby so much weakened, as to be unable to support the superincumbent weight of the body and action of the muscles; and that, therefore, it gives way and becomes curved, taking a lateral direction either to the right or to the left, according to existing circumstances, the curvature being, in extent, greater or less in proportion to the number of vertebræ concerned.

I believe it, likewise, to be the general opinion, that, when curvature has taken place in the upper or dorsal part of the spine, which is commonly supposed to be its primary seat, it naturally throws the body from its centre of gravity; and that, in order to preserve this, when in the

erect position, a corresponding but opposite curvature is necessarily produced, by counteraction, in the vertebræ of the loins, which have become weakened also from the same cause as those of the back; and that, in this manner, the double or sigmoid curvature of the spine is to be explained. And, moreover, that should a third curvature appear in the vertebræ of the neck, which is not unfrequently the case, it is to be accounted for upon the same principle.

Now it is to the fallacy of these opinions that I beg to call the attention of the profession; and I hope, in my investigation of this interesting and important subject, that I shall be able to shew, not only, that structural disease of the vertebræ, their ligaments and cartilages, is not the cause of the deformity; but, likewise, that CURVATURE OF THE SPINE IS NOT ESSENTIAL TO ITS CONSTITUTION; or, perhaps, it would be more correct to say, that no other curvature of the spine is necessary to produce the deformity, than what is common to its natural flexures and flexions.

I am quite aware of the difficulty I shall encounter, in persuading many of my readers of the

truth of these assertions, not only because they may appear somewhat singular, but because they are so opposite to the opinions that have been hitherto so generally entertained on this subject; but I hope, as they are the result of practical observation, they will be the less exceptionable; and should they, after having gone through the ordeal of criticism, be found correct, there will be no doubt, I think, of their utility, not only in establishing a proper plan of cure, but likewise, in guiding us in the adoption of the means best suited to its prevention; an object, I conceive, of the first importance.

From the absence in the contorted spine, as well in the living as in the dead body, of many of the most prominent features which characterize the curved spine, I have long considered it to be a disease very different from this, both in its nature and cause.

My opinion respecting the curved spine is, that, in every instance, it depends upon, and is produced by a morbid condition of one or more of the vertebræ, their connecting ligaments and cartilages, whether as the effect of scrofula, rickets, external violence, or other causes. That this

morbid condition of the vertebræ is followed, sooner or later, if it be not arrested in its progress, by erosion or destruction of some part of their bodies, or produces such an alteration in their structure, as to unfit them, in either case, for sustaining the powerful action of the muscles of the back; and more especially those which are destined to retain the body in the erect position. That, in consequence of this erosion, or altered structure of the bodies of the vertebræ, they give way to, and are compressed by the action of their muscles, and allow the vertebræ above and below them to approximate each other, by which that unnatural crooking or curving of the spine which is generally from within outwards, is produced; and that, unless there be a diminution of the bulk of the body or bodies of one or more of the vertebræ thus affected, whether as arising from caries, altered structure, or otherwise, no such crooking or curving of the spine can take place.

With respect to the contorted spine, my opinion is very different. I consider it to be an affection totally independent of any disease or diseased action, either in the vertebræ themselves, or in their connecting ligaments or cartilages, and that it is

produced, in every instance, by a peculiar affection of the muscles of the back, which affection of the muscles does not, in my opinion, primarily, and necessarily, unnaturally crook or curve the spine in any direction, but ROTATES or TWISTS it in the line of its axis; and that this rotation, or twisting of the spine, is, in itself, sufficient to explain, in the most satisfactory manner, all the phenomena of this important deformity.

Notwithstanding, I consider that these are two distinct affections of the spine, and that they may exist independent of each other, yet it may so happen that they may be, at the same time, combined; and it is not unfrequent for the spine of a person, after having been rotated or contorted for a considerable time, nay even for years, to become the seat of scrofula, or other structural disease*, and consequently, to produce, in the contorted spine, all the characteristic marks and attendant consequences of diseased vertebræ. I consider it to be owing to this circumstance, therefore, the combination of these two states of the

* It will be shewn, in the course of these observations, that structural disease of the vertebræ frequently takes place *as a consequence* of the contortion of the spine.

spine, that medical men have considered these affections alike, both in their nature and cause; but the error is a palpable one, and shall be treated of in its proper place.

It will be found, I believe, in every instance of the contorted spine, that there exists, to a greater or less degree, a peculiar wasting of the muscles of the back, and sometimes of the whole trunk of the body. This condition of the muscles appears to have been but little attended to by medical men; and, although it makes too conspicuous a part of this deformity to have been altogether overlooked by them, yet they have never, as far as I know, assigned to it that share in its production to which I think it entitled.

Any one who will carefully investigate the earlier stages of the contorted spine, will find that this wasting of the muscles of the back and trunk, had existed long before any displacement of the spine was observable. Whoever, then, is made sensible of this circumstance, will at once see the error of considering this wasting of the muscles to be the effect of the deformity, and will rather, I think, coincide with me in supposing it to be the cause.

This affection of the muscles may take place at any time between infancy and puberty, and it may likewise happen, although rarely, in riper years; but the most frequent period of its attack, as far as I have been able to judge, is between the age of eight or nine, and fifteen or sixteen, the reason of which shall be hereafter shewn.

The first thing that is observed in a youth in whom this affection of the muscles has taken place, is a listless inactivity, unsuitable to such an age, with a strong propensity to lounge and loll about. This is supposed to arise from the carelessness and inattention of the child in whom it is observed, who, not unfrequently, receives the chastisement of a tender parent or watchful tutor, for having, as it is supposed, acquired such awkward and unbecoming habits; and means, most pernicious in their nature, as will be seen, too often, I am sorry to say, had recourse to, to prevent their occurrence. In this, however, they are much mistaken; for it is no awkward and unbecoming habits acquired by the child, but an inability to retain the body erect, by means of the debilitated and wasted muscles of the spine.

If the body of the young person under such

circumstances be examined, although from the healthy appearance of its countenance no disease be suspected, it will be found, in many cases, that the muscles of the back, and indeed of the whole trunk, are so extenuated and wasted, as frequently to surprise, nay even to shock the beholder. The spinous processes of the whole vertebræ are seen sometimes to project from the surface of the back ; the ribs may be easily numbered through their emaciated covering ; and the scapulæ stand out ; giving to the body an unseemly and unnatural appearance. To this wasting of the muscles is added a wasting of the cellular substance which covers them ; and the skin in such cases exhibits a dingy, dry, husky, and not unfrequently shrivelled appearance.

Indeed, this wasting of the muscles in the backs of children is often observed by parents and nurses themselves, who generally are at a loss to account for it, from such children being in all other respects healthy, and becomes the source of no small uneasiness and distress to them ; and I have frequently heard a mother say of her daughter, on whom some little compliment was passed as to the healthy appearance of her

countenance, that her face was the best part of her, for under her clothes she was nothing but skin and bone. This is not an old woman's tale, but a matter of the most serious importance to the young sufferer, and has puzzled many, nay even the most learned to account for it: for be assured, that if this disposition of the muscles be not counteracted either by accidental or prescribed means, contortion of the spine, with all its concomitant evils, will be the consequence.

I do not mean to say, that this wasting of the muscles will be so great in every one, who is predisposed to contorted spine as I have described; but I will maintain, that in every instance where contortion has taken place, this wasted condition of the muscles of the back existed to such a degree, for some time previous to the deformity, as to have been quite evident to the eye of any one who is conversant with this complaint, had an examination been at that time instituted.

Emaciation of the body may take place to a very considerable extent in many of the diseases, both acute and chronic, to which children and young persons are daily subject; but in every instance of this kind, there are such manifest symptoms

indicating the presence of these complaints, that no one can be at a loss, under such circumstances, to account for it.

The wasting of the body from such diseases is general, and affects one part as well as another, being easily distinguished at a *coup-d'œil*; and I have my doubts whether, in this case, it ever produces contorted spine : at least, the many who recover from such emaciated states of the body without being contorted in their spines, I think, is sufficient to prove the point. Indeed, were emaciation from disease the cause of contortion of the spine, or other distortions of the body, I believe there would be but few straight people to be found.

The wasting of the muscles, then, of which I am speaking, and which, in my opinion, causes the contorted spine, is a local affection; the child or young person being in all other respects in perfect health. There is no concomitant fever: the secretions and excretions are healthy and regular, the appetite good, the pulse natural, sleep undisturbed, and the countenance exhibits every appearance of wonted health ; yet this state of the muscles will continue, and under all these

favourable circumstances the child will become contorted.

That such a circumstance is of frequent and daily occurrence, I think no one can deny; but why it should be so, appears to me not yet to have been sufficiently explained. It will happen to children reared under the immediate auspices of a watchful parent, as well as to those who are sent to seminaries for the purpose of education; and what, *a priori*, we would not expect, it will be found to make its appearance much more frequently amongst the pupils of such of these schools or seminaries as are adapted for the reception of the offspring of the rich, than of those which afford an asylum for the children of the poor.

I am now speaking of this affection of the muscles as it occurs in a person otherwise in perfect health; but it may likewise take place, from the same causes, in one who is in a state of disease. In this case, when deformity occurs, it is either laid to the effect of the disease itself, or ascribed to the weakness occasioned by it. Thus, for instance, if a child who has a tendency to scrofula, but more particularly if it appears in

any of the lymphatic glands, should become contorted, the contortion is at once ascribed to this disease without looking for any other cause for its production. If, however, no actual disease of the contorted parts should manifest itself, either by constitutional symptoms or local appearances, recourse then is in general had to the relaxed state of the ligaments which hold the vertebræ together, the supposed consequence of a scrofulous diathesis, to account for its production.

Such a conclusion, however, is presumptive only, and, in my opinion, neither just nor reasonable; for if we find, and I maintain we do in numberless instances, that contortion of the spine happens to a young person otherwise in perfect health, and in whom no marks of scrofula can be traced, it is reasonable to suppose, that the same may take place in one who is strongly scrofulous, without this disease being the cause, or having any connexion with it.

If this were merely a presumptive argument brought forward in support of the opinion, that contortion of the spine is not a scrofulous dis-

ease, although occurring in a scrofulous person, it might be opposed upon similarly presumptive grounds; namely, that from our knowing that scrofula does seize upon the spinal column, causing curvature in it, from the ravages it commits upon the vertebræ, it would be more reasonable to suppose, that the contortion is the consequence of this disease, when its presence in the constitution is, at the same time, so clearly marked by the affection of the glands, than to suppose it to be produced by causes less ostensible and more doubtful in their nature: but the *post mortem* appearances, I think, put the matter beyond a doubt.

Every one, in his researches into the nature and cause of the contorted spine, by the examination of the dead body, must have found many subjects, which, *a priori*, from their contorted figures, one should have been led to expect would have exhibited manifest diseased appearances in the contorted parts, but in which no traces whatever of previous disease were to be found, either in the ligaments or cartilages of the spine, or in the vertebræ themselves; and, moreover, that no deviation from the natural shape and size of the ver-

tebral bones, taken singly, was observable. Yet we are told that these contortions have a scrofulous origin !

Scrofula is a specific disease, exhibiting specific appearances ; leaving behind it, in every instance, peculiar and characteristic traces of its former existence, according to the part or tissue in which it may have been seated : and whoever has once become acquainted with these peculiar appearances, can never, I think, afterwards be mistaken in them.

It is a very common practice amongst medical men, when they are in search of evidence in the dead body, to prove some favourite opinion which they have entertained respecting a disease, to confine themselves to such appearances only as are subservient to their own purpose ; while at the same time they overlook others, which, although apparently of less importance, yet if properly investigated would throw a very different light upon such disease.

I believe, then, that contortion of the spine will afford an example of this kind. Those who favour the opinion of its origin being scrofulous,

content themselves with such appearances only as are subservient to demonstrate this notion, Hence they will select all those cases, from various anatomical museums or the tables of dissecting-rooms, which exhibit marks of the pre-existence of scrofula, which they hold out as positive proof in support of their opinion. But while they do this, they at the same time forget the number of contorted trunks they have carelessly thrown aside in obtaining such proof, in the spines of which no traces whatever of this disease could be discovered ; a truth, I apprehend, too well known to all those who frequent these places to be at all contradicted. Of what avail, then, is all the display of the wretched remains which have been collected with so much care for centuries past, and grouped together in our different metropolitan museums ? I certainly grant, that we are too plainly convinced by them of the deplorable state of deformity to which the human frame may be reduced by scrofula ; but while they convince us of this truth, they do not advance us one step in the knowledge of the many cases of contorted spine, that are every

where prevailing in this country, in which no traces of disease can be observed in the bony structure.

If scrofula, when it attacks the living body leave evident marks of its existence in the dead, which I think cannot be denied, and if it were really the cause of the contorted as well as the curved spine, then, in every instance of this deformity, we ought upon dissection to have evident marks of its former existence. This, however, is not the case; and there will be many more instances found, in which there is no evidence of the former existence of this disease, than in which there is; while to the unbiassed mind it will clearly appear, that the diminution of size, which is sometimes observable in the sides of the bodies of some of the vertebræ of contorted persons, can be accounted for upon the broad principle of absorption, the effect of unequal pressure made during the progress of a protracted deformity. From these circumstances, then, I think we are warranted in drawing the conclusion, that scrofula is not necessary to produce the deformity; and that in those cases in which it is present, it can only be considered as an adventitious disease.

But, moreover, those who suppose that this deformity is produced by scrofula, consider likewise, that there is curvature of the spine : indeed this is the general opinion. Hence they are obliged to call in the aid of the one to account for the other. For I believe it is admitted, that although disease of the vertebræ may exist without curvature, yet curvature cannot exist without disease : that is to say, that in all cases in which curvature has taken place, such a diseased state or condition of the vertebræ must have existed prior to the curvature, as, either from caries or otherwise, to have occasioned such a diminution of the size of the body or bodies of one or more of the vertebræ, as to have allowed the approximation of those immediately above and below the disease ; and that without this no curvature could take place.

If this be the case, then, that curvature of the spine cannot take place without disease, while at the same time it makes a constituent part of the deformity, as it is generally supposed, it ought of course to follow, that every contorted spine should, upon dissection, exhibit evident marks in the vertebræ of its former existence. This, however, as I have already stated, is not

the case: for contorted subjects are daily met with, in whose vertebræ no traces whatever of disease can be found; which brings me to the following conclusion; namely, that if there be no disease of the vertebræ, there consequently can be no curvature of the spine, and hence, if there be no curvature of the spine, the deformity must be accounted for upon some other principle. This I have stated to be, the rotation or twisting of the spine in the line of its axis, exhibiting to us only a changed aspect of the column, the effect of a peculiar state or condition of the muscles of the back, which always takes place some time previous to any displacement of the spine; the nature and cause of which I shall now endeavour to explain.

The same arguments may be applied to rickets, as being the cause of the contorted spine, which I have mentioned of scrofula. Besides, rickets is known to be a disease of infancy, and generally terminates long before the period at which contortion of the spine is found, in general, to make its appearance.

SECTION II.

ON THE CAUSES WHICH PRODUCE THE ROTATED OR
CONTORTED SPINE.

THE muscles of the human body, according to physiologists, consist of elementary fibres, which, being differently combined, are collected into distinct fasciculi, and constitute the greater bulk of the body.

The muscles are generally divided into voluntary and involuntary, and to each is assigned some important office in the animal economy ; the result of certain actions excited in them, which are called their functions. And as the health of the body, as well as the muscles themselves, depends upon the due and regular exercise of these different functions, so disease is the consequence of any irregularity or obstruction of them.

As the heart is the organ which circulates the blood, the liver that which secretes the bile, and the kidneys the urine, &c. so the voluntary mus-

cles are those by which the different motions of the body are performed : and although some of these organs are of much more importance to life than others, yet the regular and proper exercise of their functions are necessary to all.

The function of an organ may be simply deranged by some foreign cause, or external impression, or it may be the effect of an altered condition of the organ itself. Hence we have two states of disease, functional and organic : and as these seem to have a mutual effect upon each other, it generally happens, that during the progress of the one, the other is produced ; whereby the type of the original becomes, in most instances, materially, if not wholly changed.

As the affection, then, of the muscles of the back and trunk, which I am now considering as the cause of the contorted spine, appears to me to be an organic disease, produced in them by the improper exercise of their functions, arising from malposition, and as they are regulated by the laws common to all muscles, I beg leave to make a few remarks on this head as necessarily connected with the subject.

It is admitted, I believe, by all medical men,

that the muscles of the human body possess two powers of contracting themselves, the one belonging to them as organs of motion*, the other produced in them only for the purpose of effecting some particular object in the animal machine. They are, therefore, distinguished by different names; but to prevent any misconception, I shall beg, for the purpose of explanation, to call the former *organic contractility*, and the latter, *functional contraction*.

That there is a manifest difference between these two powers of a muscle, few, I believe, will deny, but in what essential this difference consists, relative to the disposition which they occasion in the muscular fibres during muscular motion, has not yet been satisfactorily explained, nor do I suppose ever will be. It can be remarked, however, that, in a healthy state of a muscle, its organic contractility constantly resides in it, and never ceases to operate in whatever situation a muscle may be placed, and even

* All muscles, in my opinion, are, strictly speaking, organs of motion; this being their function. I mean, therefore, motion produced in the fibres of the muscles themselves, not locomotion, which is only an effect.

continues after death. Whereas, the functional contraction of a muscle is only an effect produced in it, more or less frequently, by some stimulating cause, according to the importance of the office assigned to it in the system, and the necessity of its fulfilment.

I consider, therefore, that the contractility of a muscle is strictly organic (hence the reason of my calling it so), and that it is an inherent state or condition of it, bearing to it a somewhat similar relation that extension does to the chord of a harp, or other musical instrument; forming a constituent part of it considered as an organ of motion, upon which its function depends, and by which its symmetrical form is maintained: that it possesses no power in itself to produce motion, considered either as cause or effect, and that, when destroyed, it unfits a muscle for the due performance of its particular office in the system.

That this contractility of a muscle is not endowed with the power of motion, or rather, that it is incapable in itself of producing motion, is quite evident, I think, from the fact, that no muscle, whether voluntary or involuntary, can be made to fulfil the office assigned to it in the

system (alone the effect of a muscle's motion) or contract itself, without the intervention of a stimulus, or some foreign agent, which, it appears, in nature, is appointed to be different for different muscles. Thus the heart and arteries are excited to contraction by the stimulus of the blood, whether as arising from its volume or chemical properties, those of the stomach and intestines, by the stimulus of the ingesta we daily consume, and the different secretions which are constantly flowing into them, while those of locomotion, micturition and respiration, are alone acted upon by the stimulus of the will.

The functional contraction of a muscle, on the other hand, is that which is produced in it upon the application of certain stimuli, and by which, motion, considered either as cause or effect, is alone performed. This contraction forms but one part of a muscle's function, the other being its relaxation, which, although passive with respect to motion, nevertheless, is absolutely necessary for its completion; for no muscle is capable of contracting itself, so as to produce any sensible motion, without having been previously in a certain state of relaxation.

The function, then, of a muscle consists in the alternation of these two states, *contraction* and *relaxation*, and although produced in different muscles by different stimuli, yet is the same in all, and is the efficient cause by which the several purposes of the different muscles in the system are effected. Thus the circulation of the blood in the heart and arteries, the propulsion of the ingesta through the alimentary canal, the expulsion of the urine and feces from the bladder and rectum, together with respiration and locomotion, are but effects of one and the same cause, namely, the functional contractions and relaxations of the muscles subservient to these different purposes, produced in them by the renewed application of their several stimuli.

Contraction and relaxation, then, is a muscle's function, the due and regular performance of which, although at the command of the will, are as necessary for the health and well-being of them that move the jointed spine, as they are for those which circulate the pabulum of life.

If what has been stated, then, to be the difference between a muscle's contractility and a muscle's contraction be admitted, that is, if the

one be considered organic, and the other functional, it will not be difficult, I think, to account for the assigned cause of the deformity in question.

There is not an organ, I believe, in the body, whether muscular or not, but what will become diseased in its structure from the irregular and improper exercise of its function; and it matters not whether it obeys the dictates of the will, or be excluded altogether from its power. The heart, arteries, bladder, stomach, and intestines, which are muscular, as well as the lungs, liver, spleen, and kidneys which are not, are all known to suffer in this manner, and surely there is no proof wanting of the same having happened to the muscles of volition. These, it will be found, are as tenacious of the exercise of their functions as any other organ of the body, and equally liable to become diseased if they be not regularly performed.

The function of a muscle, it has been shewn, consists in its alternate contractions and relaxations, which, if improperly performed, although by the dictates of the will, must be considered as much a diseased function as if the same had

occurred to any of the internal organs of the body, either from the impression of their accustomed stimuli or other causes : and will not only produce disease of its structure, but by destroying its contractility, will render it useless as an organ of motion, and, consequently, unfit for its office in the system.

A muscle's function, then, is to be considered improperly performed, when its contractions and relaxations are made to succeed each other either too rapidly, or from mal-position be too long protracted ; it being this last kind of irregularity which particularly belongs to our subject.

No one can deny that the human body in all its parts is formed for motion ; and so beautifully is it constructed for this purpose, that it must ever cause us to admire the wisdom of Providence. Whoever, then, shall impose a restraint upon it in this respect, must be considered guilty of a breach of the laws of nature, and shall not fail to be punished for his temerity.

Whoever shall either accidentally or wilfully deprive any of his members of motion, or, what is the same thing, who shall fail to exer-

cise the function of its muscles, will assuredly distort such member, and lose the use of it. This is a thing of such common observation and daily occurrence, that it requires, I think, no more than the mention of the fact for its confirmation. How frequently has the surgeon occasion to observe such an accident to happen, during the cure of some surgical disease which had required the retention of a limb in a particular position ! And how many are the melancholy examples which have met the eye of our eastern travellers, of idolatrous worshippers who had voluntarily made themselves objects of deformity, by the retention of their arms and legs so long in one position, through the delusive idea of its assisting them in their contemplations, as to have caused them to become immoveably fixed in it !

The Abbè Du Bois, when speaking of the postures into which these deluded men put themselves, during their contemplations, says : “ One of them is to stand upright on one foot till the leg swells, suppurates, and breaks out in ulcers. Some will reverse the position, and continue great part of the day with their heads on the

ground and their feet in the air. Some hold their arms crosswise over their heads, until the muscles, by continued tension, assume the new direction given to them, as if it were natural, and can never recover their original position.”*

Such a perversion of the human faculties as we have here described, chills our very blood, and excites both pity and horror in every reflecting mind: and were we not acquainted with the cause of the deformity consequent to the postures of these contemplatists, we should consider it a just punishment for their idolatry. Yet we see the children of our own country, particularly females, tutored now from the dawn of life to keep their bodies constantly in one, the erect, position, and in disobedience thereof to receive from their tutors an unjust and unmerited chastisement. We see them placed upon education chairs well adapted to enforce it, or cased in stays well stiffened with whalebone or steel for the purpose. We see them tortured likewise, with this view, by collars, braces, back-boards, and other pain-

* Abbè Du Bois, p. 359.

ful contrivances : and we see them even made to reverse the position, and to continue great part of the day stretched upon a reclining board, or a cold school-room floor.

In what then, let me ask, do these postures differ from those of the eastern idolator, but in the motives for their adoption ? The one to contemplate an idol, the other to gratify a prevailing fashion : a fashion grounded upon false principles, and replete with danger.

But do not all these means which I have mentioned, combine to deprive the muscles of the backs of children, of the due and natural exercise of their function : will not they, like the muscles of our extremities and other parts of the body, made up of the same materials, and governed by the same laws, suffer from the same cause ? Surely they will ; and daily observation teaches the fact.

We see the spines of our children in this country suffering, day after day, from continued position in the same manner as the limbs of the poor deluded idolator of the east. We see their muscles, from continued tension, become rigid and contracted, distorting them, and producing

crookedness of the whole body, and we see them even swell, suppurate, and break out in ulcers.

How long such evil means, as I have mentioned, shall continue in use, and be made to distort the spines and bodies of, and bring disease upon, our helpless offspring, is not for me to tell. But I most sincerely trust that I shall not stand alone, and my voice be the only one heard in passing sentence against them ; and that I shall yet live to see the rising generation, whose cause I now advocate, hail the joyful day when they shall be for ever freed from such painful restraints, and see them abolished, not only as useless and ill-judged contrivances, but as pernicious and certain instruments of distortion.

Man was certainly formed to walk upright, but it was decreed him likewise that he should bend his back ; and he who fails to do so shall not go unpunished for his disobedience. It is the want of this simple motion of the body alone, the want of the wholesome and necessary interchange of contraction and relaxation in its muscles, or in other words, the improper performance of the function of the spinal muscles, that is contort-

ing so many of our young females in the present day ; and until the practice ceases of teaching them to keep their bodies so much in the erect position, and the means every where imposed upon them now to effect it be wholly abolished, their numbers will still increase.

But how much do we see this wholesome and necessary interchange of contraction and relaxation in the muscles of the spine abused, and even denied to children by every possible means ! The importunate cry and appalling threats of a mother or tutor, aided by the painful restraint of some favourite instrument, deprive them of it through the long and wearisome day, while the very beds in which they lie down to repose at night are carefully constructed to prevent it.

From the beautifully jointed structure of the spine, with all its muscles amounting nearly to three hundred in number, it was surely never intended that the body should stand up as a forest oak, which never bends its knotted trunk, or be stretched out like a trough-stone statue which never moves its rigid back : but that it should enjoy a freedom of motion for which it is

so admirably constructed, and so necessary for its well-being.

If we observe the male children and their habits, and consider how few of them become contorted after the manner of girls, it will at once, I think, shew the truth of what I have stated. They have not the constant cry ringing in their ears of *hold your head up and keep your shoulders back*, a cry never ceasing in the mouths of those who have the rearing of females, the endeavour to obey which on the part of children has been the means of contorting more of them than can well be told. Boys are allowed the free exercise of their bodies, and when they become uneasy in one position they change it for another. They are not in general braced up with stays, back-boards, and other contrivances, as girls are, for the purpose of keeping them from bending their backs; but remain unfettered, and when matured preserve that elegance of form which the uncontrolled exercise of the function of the muscles of their bodies is alone capable of maintaining. I say in general, for I have reason to know that young delicate boys who are sent to a girls', or preparatory school, are

sometimes treated after the manner of their female associates, and, consequently, have the seeds sown, at this early age, for their future contortion, as many at present can testify.

If we observe likewise the labouring poor, who neither have the means nor take the trouble of fettering their children like the wealthy : I say, if we look at the children of these people, how few of them do we find reared in deformity, compared with what takes place in those of the higher ranks of society. It is true, that they often follow the modes and customs of their superiors, and dress them in as well adapted stays as they do ; but their daily avocations oblige them more frequently to refrain from their use, and only to put them on when they cease from their labours. They are, therefore, never deprived altogether of the free and proper exercise of the function of the muscles of their spines, and, consequently, seldom get misshapen.

Dr. Harrison, who has favoured us with a few remarks upon the nature and causes of diseases of the spine, brings forward the unfrequent appearance of contortion amongst the labouring poor, as a proof that it is *not* a muscular disease,

whereas, I am of opinion, there cannot be a better one given in support of the contrary. His words are :—

“ Were distortions to originate in the muscles, as some experienced practitioners affirm, we should find them most prevalent among the agricultural youth of both sexes, who are employed to carry heavy burthens and perform the most laborious work ; yet it is well known that the disorder seldom appears among them, and when it does shew itself it can be traced to some obvious cause ”*.

Now it must be observed that Dr. Harrison supports a particular theory. He ascribes all spinal complaints to one common cause, and is of opinion that we shall find it in the connecting ligaments of the vertebræ. “ These,” he says, “ get relaxed and suffer a single vertebra to become slightly displaced. The column now losing its natural firmness, other bones begin to press unduly upon the surrounding ligaments ; they, in turn, get relaxed and elongated, by which the dislocation is increased and the distortion

* London Med. and Phys. Journal, No. 264.

permanently established. The direction becomes lateral, anterior, or posterior according to circumstances; *but the malady has in every instance the same origin, and requires the same mode of cure.*”

With such peculiar notions as these of our spinal complaints, it will clearly appear that it was absolutely necessary for Dr. Harrison to explode muscular contraction, together with the many other causes which have at different times been assigned for the production of these affections. But let us inquire in what manner he considers this relaxation of the ligaments to be produced. “The muscles,” he says, “destined to move the vertebræ are attached to the articulating fibrous structure. This is stretched by them, and in weakly habits becomes preternaturally elongated, partly by the muscular force pulling it, partly by the bones being pushed against it in the various turns and gesticulations of the body,” &c. We frequently find a common fact brought forward to support some favourite theory: but to be told, that all spinal complaints have the same common origin, which is stated to be relaxation of the connecting liga-

ments of the vertebræ, and that this relaxation of the ligaments is produced, as I understand, partly by the muscular force pulling them and partly by the bones being pushed against them in the various turns and gesticulations of the body; and then immediately following to be informed that, among our agricultural youth who are employed to carry heavy burthens and perform the most laborious work, the disorder is seldom known to appear, seems, in my judgment, to carry with it a degree of contradiction. Were I to argue upon the same principle I should expect to find contortion of the spine more prevalent amongst our agricultural and operative youth (many of the latter in our large manufactories are weakly enough in their habits), whose gesticulations during their daily occupations are numerous and varied; and whose muscular powers are, on all occasions, exerted with no inconsiderable force, than in the higher ranks of society, who never permit their children now to bend their backs at all. It is not because children exercise the muscles of their bodies that contortion of the spine is produced, or the complaint made muscular, but because they *do not*, that it becomes so.

Man was born to till his parent earth, and when he labours to do so, he only fulfils what was decreed him from Heaven. His body, therefore, by this natural exercise is preserved in health and strength, and retains its proper form. It is only when, by affluence, he is raised above the toils of the field, made the slave to fashion, and forgets that exercise in his exalted station is still as necessary for himself and his offspring, as it is for the man who tills the ground, that disease creeps on apace, and deforms the body in various shapes.

Let us take a female youth for instance, ten years of age, from amidst the toils and labours of her native fields, in the bloom of health and vigour of body, and who enjoyed no other than the natural and uncontrolled exercise of all her muscles, place her at a fashionable boarding-school in some splendid city, and there let her go through what is technically called a SCHOOL-DRILLING: or, in other words, let her be first well fitted with stiffened stays, and placed upon a form, with a book in her hand, raised above the level of her face, with strict injunctions given to her to hold her head up and keep her shoulders

back, in order that her rustic body may get a GENTEEL CARRIAGE: vain hope! and as an encouragement for her to continue in this posture, let one of the big Misses (for so they are called), whose deformity is only concealed, perhaps, by a well-adapted dress, be held out as a pattern. Let her now, because she seeks to relieve her aching back by bending forward the body, be placed upon an education chair, as a milder punishment for her disobedience, but as a more effectual means of forcing her into a compliance with her instructions; threatened at the same time with a collar, the torture of which has already manifested itself to her by the writhings of some unfortunate child within its grasp, should she still continue to disobey, or be found to *poke her head*. To avoid this, the little agriculturist, by every effort in her power, strives to keep erect her wearied and aching body, but strives in vain, for nature will be nature still, and with a silent tear again bends forward her head, for a moment's relief, to become the victim of the wretched contrivance with which she has just been threatened. In this manner let her be trained from day to day, while she knows not the cause thereof, until her

emaciated body awakens the attention of some of her companions around, who, with uplifted hands, declare that she is now growing out. Alarm being now taken for the safety of her figure, let more bones be put into her stays, or others procured which shall press more firmly upon her shoulder and *prop up* the body : and let her after this be made to *exercise her muscles* by walking to and fro for an hour or two every day, with a weight upon her head, counting, with anxious care, the minutes as they pass, which, in her imagination, seem to have staid their course, or been lengthened only to prolong her sufferings, an exercise supposed better suited to an agriculturist than the milder treatment she has already experienced. Let her be placed upright also for an hour every day in stocks, with her back against a wall, or a flat board contrived for the purpose, her body bridled in by a back-board, or some such equivalent, and her head stuck up in the collar, now become her constant companion, because her already twisted body makes her turn in one foot more than the other : and lest her bed should be suspected to have a share in distorting her at night let laths be put

at the bottom of it instead of sacking, and a hard stuffed mattress laid thereon, that her body, may, during her slumbers, be kept properly extended, the position supposed best calculated to avert the pending danger; and let her during this time be well drenched with salts and senna, because she fails to eat her food in the manner she was wont to do. And lastly, because she still gets more misshapen, let her be placed upon a reclining board slung by the head, to prevent *the overwhelming burthen of an emaciated trunk, from crushing downwards the bones of the spine, supposed now to have become softened by some disease entailed upon her from her parents.*

I say (not to mention the many hours she is obliged to sit and stand erect every day, to learn and repeat her lessons) let this very very common drilling of our fashionable schools be practised upon our little agriculturist, and I shall forfeit all my pretensions to a knowledge of spinal contortion, if, by the time she reaches the age of seventeen, she be not returned to her native fields in as high a state of *perfection* as the first distorted lady in the country. O tempora! O mores!

If this ungarnished description of school dis-

cipline, should ever meet the eye of those who have, or may have had the care and education of youth intrusted to them, let them pause—and ask themselves, whether they have not seen such a tale as I have just told of the little agriculturist, verified under some of their roofs. The many sorrowful examples dispersed now through every part of this country, of girls returned from schools after such discipline, to their native fields, to pine away upon couches, and endure all the miseries of spinal contortion, convince us too plainly, I think, of its truth, and ought to teach us to beware of such practices.

But it is not in our schools alone that such discipline exists, for we find it practised more or less, in every private family throughout the country. Where is the house now, let me ask, of a family that has any pretensions to wealth, into which we enter, that we do not find strewed about some of its chambers, either stays, steel bodice, collars, back-boards, dumb-bells, stocks, education chairs, steel crutches, reclining boards, or some such instruments of distortion? And where is the mother, terrified almost to death, lest her little fondlings should become the

objects of this dreadful malady, but what is constantly teaching them to sit with their bodies erect ; and that does not resort to some of the above contrivances for them, should they in themselves be found too weak to do so ? But we cease to be surprised at the introduction of such discipline into private families, when we reflect that the governesses selected now for the private tuition of children, and even the mothers themselves, have all been reared in schools and places where such practices were in use, and taught to believe, not only in their efficacy, but in their necessity.

But let me not censure mothers, for thus endeavouring to avert, from their tender offspring, a malady become now so alarmingly frequent that few young ladies may be said comparatively to escape from it ; neither let me cast a stigma upon those to whom the care and education of youth are intrusted, for making a similar attempt to ward off this evil. They are not to blame : it is not to them that such mischievous means owe their origin ; they spring from another source ; they spring from the guardians of health themselves, the medical profession. Steel bodice,

collars, education chairs, screw chairs, crutches, neck swings, reclining boards, and even the carrying weights upon the head itself ; all owe their origin to some of its members. Are we then to be surprised at their adoption in schools and families ? But here let me stop to beg that I may not be accused of invective, in thus shewing my abhorrence at these instruments and means, so much in use now amongst our females, for preserving their figures and preventing contortion of their spines, when I declare that I do so, from feeling an inward conviction, that it is to them alone that it chiefly owes its origin ; or be supposed that I am casting a reflection upon the inventors of them, how much soever I may disapprove of their use in preventing or curing contortion, or suppose them to be the cause of its production ; for I feel satisfied, when they recommended them, that they did so from the very best of motives—the motive of doing good, and preventing the spreading of this terror of the female sex : and if it has so happened, that they have reasoned upon erroneous and false principles, we can only regret the misfortune of their having done so.

Let us remember, that a child when it is born, although a beautiful model of its species, is still an unfinished work, and requires yet the lapse of many years before it arrives at perfection. And let us remember also, that the evolution of its body, as well after birth as before it, is alone the work of nature, the work of Him who created it, and belongeth not to man: and that the same hand, which gives features to its face, will give form also to its body. Any attempt then, before a child is matured, to model the figure of its body by any contrivance of human invention, must assuredly be considered an impertinent and presumptuous interference with the works of nature.

Nature, it can be observed, does not in every instance bring forward her creatures to perfection in the same regular and uniform manner; and her reason for doing so will never, I apprehend, be disclosed to man. Neither does she give to all beauty and a graceful figure: and it will be found, that she has made as great a distinction in the shapes of our bodies as in the features of our faces. The child, which to us appears to combine in its person beauty with ele-

gance of form, will frequently when matured possess neither : while the child that has nothing in its appearance to attract our notice will often, in adult age, become both beautiful and well formed.

Let us not then attempt to form our judgment upon the body in its unfinished state, but patiently wait until it be matured ; and should nature then produce us children with those personal attractions after which all seem so much to thirst, let us consider ourselves highly favoured for the distinction. But should it be otherwise, let us rest assured, that no interference on the part of man could have remedied the defect ; but, on the contrary, that it would in every instance have been rendered worse.

The unconstrained and daily exercise of the muscles of every part of the body are as necessary to preserve it in shape, health, and strength, as the food we consume is to furnish it with nourishment and support. But fashion, that harbinger of human misery, raises its powerful arm against these sanative principles of nature ; and so much does its influence outweigh the dictates of reason, that we are even led to attempt, by

constraint, to model our own bodies. Do not all those who have the care of female children committed to them, allow themselves to be influenced by fashion, in the adoption of stays, collars, braces, &c. for the objects of their charge? And do they not also adhere implicitly to what fashion has pointed out, forsooth, to be the best modes of sitting, standing, lying, and even of exercising the body? And is not all this for the purpose of modelling their figures? Aye, but modelling them to deformity.

Such, moreover, is the powerful influence of fashion that some allow themselves to be so much led by it, as to dress new-born infants in stiffened stays. But such a practice, in my judgment, cannot be too highly reprobated, and its baneful effects too widely proclaimed. If those who use stiffened stays for their infants do so from the impression that it will save them from becoming crooked in their bodies, let me entreat of them to banish such thoughts from their minds, for they only deceive themselves; and to assure them that, instead of such a practice being in any way a preventive of contortion of their spines, it will in every instance prove a powerful means of pro-

ducing it, and bring disease even upon their tender bones.

The causes, then, of the organic disease of the muscles of the back, which I have said produces contortion of the spine, may be briefly stated to be whatever shall, by retaining the body in the erect or extended position, keep them too much in a state of contraction, and prevent in them the necessary interchange of relaxation; whether this shall be occasioned by the voluntary effort of the child itself, to obey the importunate cry of its mother or governess, *to keep the head up and shoulders back*, or by any of those painful instruments which are so much used now for this purpose.

Position of whatever part of the body, if long continued, will certainly disorganize its muscles; and it matters not what position may be assumed. It appears to me, however, that this disorganization of a muscle is more the effect of its constant contraction than of its constant relaxation. For example, if we extend one of our limbs and keep it in that position, we shall find that it will be the extensor muscles which will chiefly suffer, that is, they will become permanently contract-

ed, and probably never admit again of being fully relaxed. Whereas if the limb be retained in the bent position, we shall find that it will be the flexor muscles which will be so affected. While I state this, I admit, at the same time, that a muscle's power of contraction may become much or wholly impaired, from its being kept constantly in a state of relaxation. Yet I am of opinion, that it will bear this state for a much longer period, and with much more ease and safety to the person, than it will do that of contraction. It will follow, therefore, that however much the muscles of a member, which, if retained in one position, shall suffer disorganization, those which are kept in a state of contraction will suffer most, and be primarily effected. Nor does it matter in this respect, whether the member be retained in its position, through the voluntary efforts of the person, by the functional contraction of its muscles, as we have seen in the eastern idolater; or be left at rest with them wholly under the influence of their organic contractility, for the effect in disorganizing the muscles will be the same.

If we observe a person when he sits down to rest himself, we shall find, that he generally leans

backwards, and lets his body, if I may be allowed the expression, sink down within itself. This sinking down of the body, this semiflexion of the spine, or protrusion backwards of the loins, appears to me to be what nature has appointed to preserve the muscles in health, which are destined to support the body of man, who, contrary to all other animals, is made to move in his progression with it erect, and to relieve them when they become exhausted in their strength from over-action ; for we all fly to it in this case, being instinctively led to appreciate its value. The wearied traveller sinks, to enjoy it, into his chair when he arrives at his long-wished-for home. The sportsman, when he returns from his fields, is no stranger to its value. The labourer seeks it frequently, by sitting down in the midst of his labours. The senator in the senate-house, the counsellor at the bar, and the divine even at the sacred altar, all know its worth after being exhausted by a long and arduous address. While the sluggard, seated in his chair, passes the greater part of his time in this position, with ease and comfort to himself. 'Tis sweet, 'tis pleasant, 'tis good, 'tis natural ; and ought no more to be denied to the young and tender child, than it is

to the more perfect and robust adult : but how much is it done so now to young females by all those means which I have mentioned, and nature punished in nature's child ? I consider it to be owing to this circumstance, the denial to female children of this necessary relaxation of the spinal muscles when they sit down, that much of the contortion of their spines is to be ascribed : for when it is denied them, the muscles of their spines are kept constantly in a state of contraction, which, at so tender an age, they are unable to bear. And it must be admitted, I think, by every one, that when muscles are over exerted, the consequences will be exhaustion of their strength and disorganization of their substance.

Amongst the causes which produce organic disease of the muscles of the back and trunk, pressure may be mentioned. The effects of pressure on the living body, are known to be various; but, as I do not wish to notice any of them, in this place, farther than what relates to the present subject, I shall confine myself to what I conceive may be produced by the wearing of common stays. Stays are not only worn by children now as part of their dress, but also as

a supposed means of preventing them from becoming crooked in their spines. With this view they are made to fit the body very tight by lacing, otherwise they would fail to give it that support which it is supposed to require from such an expedient.

In the practice of surgery much benefit is every day obtained from pressure made by a well-adapted bandage, particularly in diseases of the extremities; but I have no doubt that, with myself, many have seen persons crippled by its injudicious use.

Pressure made by a bandage applied moderately tight round a limb, will give to it a grateful and pleasant support, particularly if the bandage be of such materials as shall yield to the swelling and subsiding of its muscles during their action. But if a bandage be applied so tight round a limb, and consists of such materials, as shall not yield to the muscles during their action, its effects upon such a limb will be to impede its motions, diminish its size, and ultimately to render it useless, by disorganizing its muscles. Accidents of this kind I have known to happen during the protracted cure of ulcers upon the extremities; and I once saw a young man made

to walk, ever after, on the tips of his toes, by a strap of adhesive plaster which was *injudiciously* made always to encircle the leg, for the cure of a small ulcer upon the fore-part of the tibia, about three inches above the ankle. The pressure from the strap, in this case, produced disorganization of the gastrocnemii muscles*.

Such an accident as this, resulting from pressure, when it is made with the view of doing good, can only be regretted; but it has sometimes been resorted to for a more ungracious purpose, which I shall merely mention, to shew its baneful effects upon the living body.

It must be in the remembrance of all, during the late war, and before begging was altogether suppressed, to have seen men dressed in the garb of sailors, craving alms in the streets, whose limbs were so crippled, by means of pressure from a tight bandage, as to be reduced to the size of a common rolling-pin, which they never failed to expose to public view, and impose upon

* Since made acquainted with this accident, I have often thought that many cases of pointed toe were similarly produced in children and young persons, by the strings of their boots and shoes having been incautiously drawn too tight round their ankles.

the unwary. This wretched means of subsistence, while it unfolds to us the depravity of man, furnishes, at the same time, an instructive lesson, of the pernicious effects of pressure on the living body, and to what a state of wretchedness and deformity it may be reduced through its baneful influence.

If the muscles, then, of the extremities, shall suffer in the manner I have described, from the pressure of a tight bandage, the same, surely, will happen to the muscles of the trunk of the body, from the pressure of tight stays. Stays, when tightly laced round the body, will impede its motions, reduce its size, and ultimately disorganize its muscles, and produce that miserable deformity of it, which their use is supposed to prevent.

The progressive effects produced upon the muscles of the back, from the continued application of the causes mentioned, which is the disorganization spoken of, are, in the first place, debility; secondly, a wasting of their substance; and, lastly, permanent contraction of their fibres.

If continued position, then, shall disorganize the muscles of the human body in the way I have stated; and if this disorganization of the

muscles, when it takes place in those of the back, shall contort the spine in the manner hereafter to be shewn, it becomes a matter of the greatest importance to inquire whether the several modes and customs adopted now, during the education of the female youth of this country, for the prevention of this distressing malady, be not the cause of it: and this, I think, will appear evident, from the following considerations.

1st. That all the means made use of now, for preserving the figures of young girls, and preventing contortion of their spines, from the cry of those who have the care of them, *to keep themselves erect*, or the common stays, down to the reclining board, or school-room floor itself, tend to keep their bodies in the extended position.

2dly. That the bodies of children being kept in this manner constantly extended, the extensor muscles of their spines are kept, consequently, in a state of constant contraction, and are seldom or never allowed the interchange of relaxation, which is an indispensable part of their function.

3dly. That all the muscles of the body being subject to the same laws, and liable to become affected from the same causes, the muscles of

the spine will suffer disorganization from continued position, in the same manner as those of other parts of the body.

4thly. That the effect of disorganization of muscles, is always distortion, to a greater or less degree, of the part or member to which they belong, and which they are destined to move.

5thly. That contortion of the spine is found to prevail a hundred-fold amongst the children who make use of these means of prevention, than it does amongst those who do not. Hence its frequency amongst the children of the rich, and its unfrequency amongst the children of the poor; and hence, also, its frequency amongst girls; and its unfrequency amongst boys, even although of the same family.

6thly. That contortion of the spine has evidently increased, in proportion as the adoption of these means of prevention have been diffused throughout this country.

Having considered, then, what appear to me to be the causes of contortion of the spine, I shall proceed now to shew in what manner the deformity is produced, agreeable to the principles laid down.

SECTION III.

ON THE MANNER IN WHICH THE ROTATION OR CONTORTION OF THE SPINE IS PRODUCED, AND THE REASON OF ITS BEING MISTAKEN FOR AN INCURVATION OF THE SPINAL COLUMN.

IN entering on this important part of our subject, I shall make no observation on the structure of the spine, farther than by calling the attention of my readers to its form, its motions, and the attachments of some of its principal muscles.

When in the erect position, we survey this beautifully constructed column from the head downwards, we observe in it, contrary to every principle of architecture, three curvatures or flexures; the first of which inclines forwards to form the neck, the second, backwards to form the back, and the third, again, forwards to form the loins; and there may be yet a fourth included, inclining again backwards, by those who reckon the sacrum as part of the column; but, as this does not contribute to the production of

the deformity in question, I shall only notice three.

The three natural flexures of the spinal column*, viz. in the neck, back and loins, although existing in every one, like other parts of our bodies, are seldom to be found, in two persons, exactly the same, nor do they always bear a relative uniform proportion to each other, and it is on this account that the difference of the figure of the trunk of the body, in different individuals, more particularly depends.

Some are observed to have this proportional difference more in the neck, some in the back, and others in the loins. Thus we have people with long and short necks, flat and rounded shoulders, and straight and hollow loins. Now, all these differences in the different flexures of the spinal column, in different individuals, are quite natural to them, and can no more be altered by the hand of man, without disfiguring the body, than the features of the face. Yet, how often is the attempt made to do so upon children, whose figures, from the conformation of

* I speak of these flexures of the spine as being natural to man in the erect position.

their spines, do not please the eye, by every contrivance which art can devise. Can we be surprised, then, at seeing so many deformed children? Certainly not, since every deviation from the natural form of the body *must* be a deformity.

If we look, again, at the spinal column, and observe its motions, we shall find that these, although limited in extent, are not so in direction, for we can not only bend the spine directly forwards and backwards, but we can rotate it to a considerable extent, as we observe, when turning round the body to look behind us. This rotatory motion is that which allows the spine to be bent at every intermediate point between the two former directions, and gives it all that freedom of motion enjoyed by a ball and socket joint.

These several motions of the spine are allowed to a greater extent in some parts of the column than in others. They are allowed, for instance, to a greater extent in the neck than in the loins, and in the loins than in the back. Moreover, as every single vertebra is allowed these different motions but in a very limited degree, it is only by the aggregate movement of several, or the whole,

that the column enjoys that freedom and extent of motion which we can observe in it.

Of the motions of the spinal column, that directly forwards and backwards is greatest in extent, and it will be observed, that its natural flexures are both increased and diminished at the same instant, exactly in proportion to the extent of these motions, *c. g.*: If, from the erect position, we bend the body directly backwards, the flexures of the neck and loins will be increased in proportion to the extent of such flexion, while that of the back will be diminished; whereas, if we bend the body directly forwards, the flexure of the back will be increased, while that of the neck and loins will be diminished; and, in the greatest extent of flexion forwards, these latter will become reversed, so that the column will be thereby made to form an elliptical arch with its convexity backwards.

It may be also observed, that, independent of the difference of extent of motion in different parts of the spinal column, some people, from peculiarity of bony structure, and the looser connexion of the vertebræ with each other, enjoy a much greater extent, and freedom of motion, in

the whole column than others. This is seen to a considerable degree in mountebanks and tumblers. Now, I wish this looser connexion of the vertebræ, in some individuals, to be borne in mind, for I think it will explain, why lesser degrees of contortion are more frequently attended with consequent structural disease of the vertebræ than greater—a fact, I believe, not as yet satisfactorily accounted for.

For the accomplishment of the different motions of the spine, there are many muscles, some to regulate the movement of each individual vertebra, and others that of the whole column; and although its general motions depend upon the *tout ensemble* of these, yet there are some on which the force more particularly falls, and which I consider to be principally concerned in contorting the spine, but I have no doubt many more contribute. The muscles I allude to are what are generally called the *long extensors* of the back, viz. the sacro-lumbalis, and longissimus dorsi*, with the quadratus lumborum. All the

* When speaking of these muscles, I shall retain the term extensors in conformity to the language of anatomists, although they are evidently flexors of the spine, as will appear from

muscles of the human body, destined for locomotion, as well as change of position, have, of necessity, their points of insertion at certain or given angles from their points of origin, and so it is, of course, with the muscles I have just mentioned. The longissimus dorsi, we know, takes its origin from the pelvis, and is inserted into the transverse processes of all the vertebræ of the back and loins. The quadratus lumborum arises also from the pelvis, and is inserted into the transverse processes of all the lumbar vertebræ. And the sacro-lumbalis arises in common with the longissimus dorsi, and from the transverse processes of the vertebræ of the loins, and is inserted into the angles of the ribs. It is evident,

the following experiment. Let any one, by means of a cord, measure the length of the spinal column of a person whose body is bent to its greatest extent forwards, and afterwards, when he stands erect, and he will find a difference in these measurements of four, and sometimes five inches. This difference in the length of the spine, in these two positions of the body, is occasioned by the column being *bent* to form its flexures in the erect posture, by the action of what are generally called the extensor muscles of the spine.—Probably the term *erectors* would be more appropriate.

then, that as these muscles are inserted into transverse levers, they become muscles of rotation as well as extension. For example, if the extensor muscles on both sides of the spine be thrown into equal action at the same moment, the motion produced will be direct extension of the column; but, if they be thrown into action only on one side, the spine, although made to incline in the direction of the muscles' forces to that side, will be moved by means of the rotatory movement of the vertebræ. For instance, let any one stand erect, fix the pelvis, and look to pick up any thing from a chair, or such like, placed immediately behind him, and he will find that he can only do so, by calling the extensor muscles of one side of the spine, aided no doubt by others, into action, and rotating the vertebræ.

If the extensors of the spine, then, from being inserted into transverse levers (the transverse processes of the vertebræ), be constituted muscles of rotation, when they act on one side only, it will follow, that should disorganization, producing contraction, take place in those of one side, the effect of this contraction, by its overbalancing the action of their fellows on the op-

posite side, will be to rotate the vertebræ to which they are attached, and destined to move; and, consequently, to produce rotation or contortion of the column, and not curvature.

Whilst I consider the muscles I have mentioned to be the principal ones in producing contortion of the spine, still I am of opinion that some of those which regulate the individual motions of the vertebræ, greatly contribute to it; at least we are warranted in such a conclusion from their attachments.

Having premised these cursory observations upon the flexures, motions, and attachments of some of the principal muscles of the spine, I shall now endeavour to shew, in detail, how contortion takes place on the principle of rotation of the vertebræ.

The difficulty at all times experienced in enforcing obedience from children, but more especially if it be to impose any bodily restraint upon them, is the chief reason why they are in early infancy exempt from this disease. Regardless of threats, and fearless of punishment, they do not, at this age, hesitate to disobey the instructions they may have received as to the observ-

ance of any position in which it may be wished they should particularly remain : nor are those who have the care of them, at this period of their lives, so anxious in general about it, or rigorous with respect to its observance. They, therefore, although always tutored to observe, as much as possible, an erect position of the body while sitting or standing, seldom continue so long in it as to produce any disorganization of the muscles of their backs. But I have no doubt, when much strictness has been observed with them, that their muscles have been made to suffer even at this early age, so as to lay the foundation for the future appearance of contortion, and even then to produce it.

When female children, however, reach the age of nine or ten; and with some at an earlier period, the cares and anxieties of their mothers and tutors about the preservation of their shapes, as well as the safety of their spines, are in general redoubled, and a compliance with what custom or fashion has deemed the most suitable to obtain these, by means of position, imperatively insisted on. The more general method to which mothers resort for this purpose, is to impress

upon their children the necessity of a strict observance to a proper carriage constantly of the body, not only as it regards their present safety, but as it will insure their future comfort and happiness, holding out, probably, at the same time, the unfortunate situation of some young lady of their acquaintance (distorted, no doubt, by a similar advice), as a certain consequence of the non-observance of this essential.

The natural emulation, so strong in the breast of all young females, to excel both in beauty and elegance, is kindled by this supposed wholesome advice of those whose constant care it is to watch over them, and allures them, terror-struck lest they should become deformed in their spines, from nature's pleasant and unerring path, into the rugged ways of ruthless fashion, and causes them, regardless of the frequent admonition they receive of their error, by an aching back, to continue, by every effort in their power, a practice which is to destroy, ultimately, a figure that might have been perfect and graceful, and not improbably a life also that would have become valuable to society.

But, independent of this ill-judged advice of

mothers to their children, and the emulation which it never fails to inspire them with, it is at this age that they impose some additional restraint upon their bodies by means of stays, beginning with a single bone in front, as it is called, but not ending until they get them as completely cased as they well can be. It is at this age, moreover, that they are generally sent to boarding-schools, where, I need hardly observe, the greatest pains are always taken to *improve* their figures, by every contrivance that art can suggest.

This restraint now upon the bodies of children, keeps the muscles of their spines constantly in a state of contraction, and never allows the free and necessary interchange of relaxation in them ; or, in other words, impedes their functions. In this contracted condition they remain day after day, and night after night (for it may be observed, that their beds are now made to keep the body extended as much as possible), until the extensor muscles, by this constant action, get disorganized and become contracted, and as the stress more particularly falls upon the muscles of one side of the spine, as shall be pre-

sently shewn, so it is that they chiefly suffer this disorganization and produce the contortion.

The right arm is that which is generally made use of; and if any one will observe where the force falls when we handle or do any thing with it, he will find it to be on the muscles of the left side of the body, and more particularly on those of the loins and long extensors of the back. Let any one, for instance, hold out a weight for a few minutes, with the right hand, and he will find that he throws the muscles of the left side of the loins into strong action, and inclines the body to that side. If again we attempt to pull forcibly with the same hand, as at a cord, we are led instantly to step backwards with the left foot to preserve the centre of gravity of the body, now bent obliquely backwards, by the strong contractions of the muscles of the left side of the spine.

If the greater forces then exerted by our right arm fall particularly upon the muscles of the left side of the spine, so likewise will the lesser ones; consequently, it is the muscles of that side which we find most frequently to suffer disorganization, and become contracted, owing to the cause of

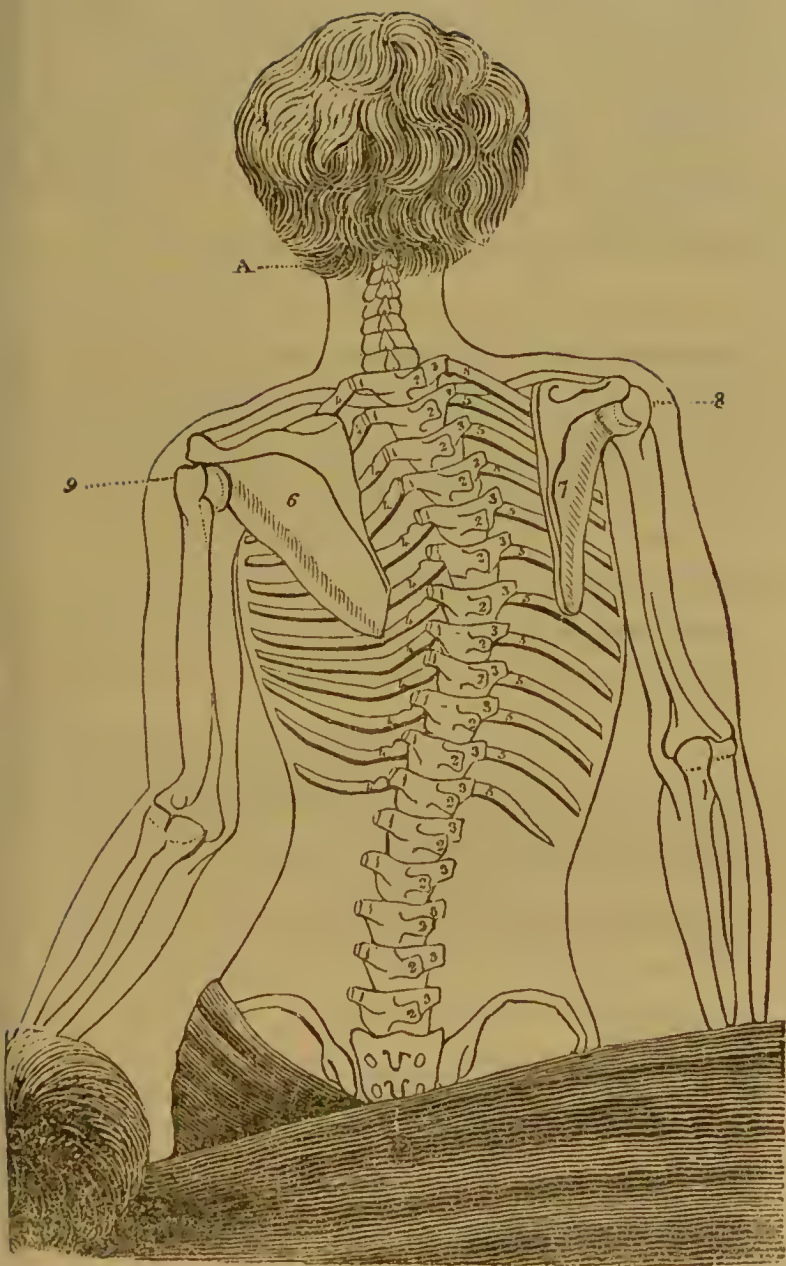
this disorganization being greater in them, than in those of the opposite side, and is the reason why contortion is so often to the right side.

The muscles then of the left side of the spine being, from the causes above-mentioned, those which suffer disorganization in particular, and more especially the *quadratus lumborum*, *sacro-lumbalis*, and *longissimus dorsi*, they, by the force of their diseased contraction, overcoming the action of the muscles of the right side, rotate the vertebræ to which they are attached, because of the angles formed, relatively, between the vertebræ and the pelvis (the points of origin and insertion of these muscles), and the force of their contraction acting upon moveable horizontal or transverse levers, namely, the transverse processes of the vertebræ.

It must be observed, that the rotatory motion of each individual vertebra, like its other motions, is very limited, but the multiplied or aggregate motion of the whole is considerable. When this takes place it gives us a profile or rather a semi-profile aspect of the whole column; as here represented:—

REFERENCES.

- A. B. Back view of the spinal column semi-rotated, so as to shew the sigmoid flexure of its proper profile.
1. Left transverse processes of the vertebræ raised nearly to the level of the spinous processes.
 2. Spinous processes, depressed and turned toward the right side.
 3. Right transverse processes, so much depressed, and covered by the spinous processes, as not to be felt by external examination.
 4. Ribs on left side too much approximated, and their angles turned downward.
 5. Ribs on the right side preternaturally separated, and their angles turned upward.
- NOTE.—Could the sternal extremities of the ribs be shewn, without confusing the sketch, the variations in their relative distances would be much more apparent.
6. Left scapula dragged down from its natural position.
 7. Right scapula forced higher than natural, with its inner edge turned upward and outward.
 8. Head of the right humerus carried forward by the glenoid cavity of the scapula, and scarcely to be seen behind.
 9. Head of the left humerus brought backward, so as to shew more of the ball than is naturally seen in this position.



Drawn by H. Woods, Surgeon.

This changed appearance of the spinal column has, until this explanation, been generally supposed to be so many curvatures in it; but which in fact are only its natural flexures, brought, as I have just shewn, into side view, by the aggregate rotatory movement of the whole vertebræ.

This rotatory movement of the vertebræ produces consequent displacement of the ribs, and other bones of the chest, which it appears to me takes place in the following manner:—

All the ribs, it will be observed, have a double attachment to the vertebræ; one, by their heads to the bodies of them, and the other, by their tubercles to the transverse processes. This last mentioned attachment is somewhat below the former, and is more or less so, according to the obliquity of the ribs with the spinal column.

When the vertebræ, then, are made to rotate upon each other, in the manner described, by the permanent contraction of their muscles, and this, for example, to the right side, which is the more frequent direction they take, from the causes noticed, they, by this movement, push out, or backwards, the heads of the ribs of the

left side, and force their sternal extremities considerably forwards, because of the quick circular turn which the ribs make between their angles and their points of attachment to the vertebræ, and the very small motion, from such a formation of them, requisite here to produce it. Together with this movement of the ribs, which produces the projection of the left side of the chest in front, they are also made, from their double attachment to the vertebræ, to fall down, and approximate, or, as it were, overlap each other, at their angles. This causes that hollowness or sinking in of the left side of the chest behind. The falling down of the ribs here described, appears to me to be in part owing, also, to the permanent contraction of the sacro-lumbalis muscle, which is inserted into all their angles.

While these movements take place with the ribs on the left side of the body, the very opposite, of necessity, happens to those on the right. By the rotatory movement of the vertebræ, the ribs on the right side have their heads, contrary to those on the left, drawn inwards, and their sternal extremities made to recede backwards ;

while their double connexion with the vertebræ, causes them, contrary also to those of the left side, to be raised up and separated from each other at their angles. This rising up, and separation of the ribs at their angles, is what produces the projection of the right side of the chest behind.

From this altered position of the ribs on both sides of the chest, the scapulæ are made to occupy unnatural situations; the left is dragged into the middle of the dorsal flexure, now seen in profile, while the right is pushed beyond the angles of the ribs, down upon the right side of the chest. By this movement of the scapulæ, we shall find that the left shoulder, that is, the head of the humerus is carried into a straight line transversely from the neck, while the right is thrown forwards, and hooked down upon the chest. This hooking down of the right shoulder upon the chest, causes the pectoral muscle of this side to become much contracted—a circumstance to be attended to in the cure.

This change upon the ribs produces, likewise, a corresponding change in the position of the sternum and clavicles. But the movement of

these bones will depend much upon that of the first dorsal vertebra.

It does not happen, in all cases of the contorted spine, that the whole column is moved round; if it were so, we should have invariably the profile of its three flexures brought into view in the manner described; whereas, it is well known that there are frequently but two of them observed. The reason of this variety, according to my experience and observation, depends upon the following circumstance. Of all the ribs which enter into the formation of the chest, the first are the most immovably connected with the vertebræ and sternum; and so strong, in some individuals, is this connexion of the ribs, that it resists the whole force of the contracted muscles of the spine, and retains the first dorsal vertebra *in situ*. In this case, the rotation is confined to the vertebræ which are situated between the first dorsal and sacrum; hence, we have only exhibited to us the profile of the flexures of the back and loins, while the clavicles and sternum remain in their natural situations. In many instances, however, this connexion of the ribs is not so strong as to resist the force of the contracted

muscles; in which case, the first dorsal vertebra is moved round with the others, and allows the whole column to be brought into profile in the manner I have already shewn. In this variety of the complaint, there is much more deformity of the chest than in the other, as not only the ribs, but, from the movement of the first dorsal vertebra, the clavicles and sternum, become changed in their situations.

I have stated that contortion of the spine takes place most frequently to the right side; but we find it, in many instances, to the left. When this happens, the same changes are produced upon the bones of the spine and chest as I have mentioned, in an opposite direction, and the complaint exhibits exactly the same appearances. It sometimes happens that the muscles of both sides of the column become contracted from position. In this case, the greater number of the vertebral joints are anchylosed, and the body is arched backwards. I had a good illustration, lately, of this sort of deformity in a little girl, about twelve years of age, whose daily occupation was to seam stockings. In this employment, she always preserved an erect position of the body, by which

the extensor muscles of both sides of the spine became contracted, so as to produce the appearance above described. There seemed to be, in this girl's case, no motion in any of the vertebral joints below the third dorsal, for, when she attempted to bend the body forwards, she was obliged to place both hands upon her knees to preserve the centre of gravity, and to prevent herself falling.

As this view of spinal distortions differs from that which has been generally given of them, and as some corroborating proof will naturally be looked for, I shall, as the best mode of affording it, candidly describe the manner in which I was first led to a knowledge of it myself, with my reasoning thereon, and what I resorted to, to prove it.

Having been induced, of late years, to apply myself more particularly to the investigation of this interesting deformity, and being previously convinced, in my own mind, that it depended more upon muscular contraction, brought on by the fashionable modes and customs of the day, than upon structural disease of the vertebræ, I was led to the adoption of friction for its cure:

and in order that I might give it the fairest trial possible, I was induced to become the operator myself.

During the course of my operations upon several patients, I was struck in all of them (for they were all contorted to the right side) with a considerable bony hardness and projection on the left side of the loins, raised nearly to a level with the spinous processes; and this I found to be the case in the patients whose spine exhibited little or no apparent curvature in the loins, as well as in those in whom the apparent curvature was very great*. Being led to investigate this anomaly, I redoubled my exertions to discover the cause; and I found, after the muscles had been relaxed by friction (for they were in every case extremely rigid), that the bony projection was the transverse processes of the vertebræ of the loins, which I could now as distinctly feel and count as the spinous. From this circum-

* I must beg it to be perfectly understood, that in all my descriptions of this deformity, I am speaking of cases only in which the vertebræ are *completely rotated*, and not of slight and incipient ones: for it cannot be expected, in the latter, that the changes of the bones will be so demonstrable.

stance, I was led to examine whether I could feel the transverse processes of the same vertebræ on the opposite side, but without effect, for they appeared to have sunk inwards, completely out of reach. Having satisfied myself of these facts, I then reasoned in the following manner.

If these distortions of the spine, as it is generally supposed, depended upon a direct lateral curvature of the column, the transverse processes, although they would be, in this case, separated from each other on the one side, and approximated on the other, yet would they not be altered in their transversity, with respect to the body, and consequently ought to be as easily discovered and felt on the right side as on the left, but which I found was not the case. I then asked myself what movement of the vertebræ would bring their transverse processes to be so prominent, and so distinctly felt on the one side, while they were totally out of reach on the other, and I concluded it must be their ROTATION.

Being satisfied that this movement had taken place in the vertebræ of the loins, I suspected that the same had occurred to those of the back; but as I had no transverse processes

here to guide me, similar to what I had in the loins, because of their attachment to the ribs, I was obliged to confine my examination to the spinous processes, which I found evidently to lie obliquely over to the right side, in contact nearly with the ribs, which were raised up in an opposite direction.

Being now convinced, also, that the vertebræ of the back were rotated like those of the loins, I concluded that those of the neck had undergone a similar change; and, therefore, that the whole column was spirally twisted, and exhibited to me the profile of its natural flexures.

Although satisfied in my own mind, from my examinations, that such a movement of the whole vertebræ was possible, and had actually taken place, yet I found that a more certain proof of it was needed. I therefore, as the best mode of affording this, had recourse to the rotatory motion of the head; reasoning thus:—

If the whole spinal column be spirally twisted by the aggregate rotatory movement of the vertebræ, the rotation of the head on its axis will prove the fact. For, as the head is equally limited in its rotation to both sides of the body,

and as the spinal column is the pivot on which it turns, so will it be increased to the one side, and diminished to the other, relative to the trunk of the body, exactly in proportion to the extent of rotation of the column, if such shall exist.

My reasoning in this case, I found, was correct: for on making my patients, in whom the whole vertebræ of the column had moved round, rotate the head while in the erect position, I found that they could carry it, in this motion, considerably more to the left side than to the right, which was exactly what I conceived would happen. To satisfy myself still farther, as to the reality of this circumstance, I caused one of my patients, whose spine I considered to be more rotated than the rest, to lie down upon her back on the floor, and in this position to try the same experiment, and I found that she could touch the rug on which she lay quite easily with the left cheek, while she could not do so with the right, by more than three inches*. This experiment I did not consider so certainly conclusive as the

* This will explain why the head of some distorted persons falls always to one side during sleep, as noticed by some authors.

first; for I thought the projection of the right ribs behind might have some share in causing such a difference, although I had no reason to suppose that it could be influenced much by it. The same experiment I made with my other patients, whose spines were similarly rotated, and the result in all of them was the same, but in a lesser degree, for neither of them were so much twisted as the one before mentioned; which completely convinced me that the complaint is not CURVATURE, but ROTATION *alias* CONTORTION. Since making these experiments, I have had ample proof of the correctness of my opinions.

This difference in the rotation of the head from side to side, which I have mentioned, does not happen in every contorted person; the reason of which I have already, in a measure, accounted for; namely, that in many cases of contortion, the uppermost vertebra of the back is kept *in situ* by the strong articulations of the first ribs. When this happens, the rotation is confined to the vertebræ of the back and loins, and does not extend to those of the neck; consequently the motions of the head are not affected. From this circumstance I resort to the rotation

of the head, to ascertain the extent of the contortion; that is, whether the vertebræ of the whole column are rotated, or only those of the back and loins.

There is another experiment that may be made by any of my readers, which, although it does not prove the reality of rotation, yet may serve as an illustration of it.

Let any one, for instance, take the exact shape of the spinal column between the head and sacrum of a person who is not distorted, by means of a leaden wire, sufficiently thick to support its own weight, applied along the spinous processes of the vertebræ; hold this mould of the spine up by its lower extremity between the finger and thumb, and gently rotate it, and it will be seen what a small rotatory movement will suffice to give it all the appearance of a contorted spine. Divide the sum of this movement by twenty-four, the number of the vertebræ, and it will give the exact extent of the motion of each vertebra, necessary to produce the same appearance in the spinal column which will be found extremely small. This experiment will serve to explain, likewise, why spinal contortions differ so much

in appearance, in different individuals; for if it be repeated on several persons, it will shew a difference of flexure in each, and consequently, a different profile.

I may here observe, that this difference in the natural flexures of the spinal column of different persons will influence much the consecutive deformity of the ribs; for, inasmuch as the dorsal flexure shall be greater in one person than in another, so will the motions of the ribs be greater or less, and, consequently, their displacement, when the column is moved round: because (independent of the movement of each vertebra individually) the arc described by the dorsal flexure, in the aggregate movement of the vertebræ which form it, is that of a greater or lesser circle, according to the extent of such flexure. The displacement of the ribs will, likewise, be influenced much by their oblique position with respect to the spinal column, and their double attachment to the vertebræ: hence it is, that there is more deformity of the chest in those whose ribs are placed obliquely, when contortion takes place in them, than in those in whom they are placed more horizontally. In the same man-

ner will the difference of the lumbar flexure in different persons cause a difference of appearance in the loins of contorted subjects. For instance, when contortion takes place in one whose loins are very hollow, that is, in whom the lumbar flexure is considerable, the vertebræ of the loins will be carried over in their rotatory movement to the side opposite to that to which the dorsal flexure is, and there will be, in this case, a great sinking in of the loins on the same side on which the shoulder projects. This is what, in general, is called the SIGMOID CURVATURE of the spine. On the other hand, when contortion takes place in one in whom there is no lumbar flexure, or whose loins project rather backwards, which is sometimes the case, then there will be a very different appearance; the column will form one great curve to one side, in this instance, and the whole trunk be carried over in that direction. Between these two extremes there is every variety, depending entirely upon the natural form of the spine and its flexures.

We find, likewise, in contorted subjects, considerable displacement of the pelvis. But the direction which it takes, according to my expe-

rience, will depend entirely upon the extent of the lumbar flexure. For example, when contortion takes place to the right side, in one whose loins are naturally very hollow, the lumbar vertebræ, from being carried over towards the left side, will cause the pelvis to be thrown out to the right. On the contrary, should there be little or no natural flexure in the loins of the contorted person, then, in this case, will the pelvis be thrown out to the left side, in consequence of the whole body, as I have shewn, being carried over to the right. These displacements of the pelvis cause, in some cases, a difference in the length of the legs, and, consequently, an awkwardness in the gait of the person.

With respect to the motions or flexions of the spine of contorted persons, it will be seen, that the direction of them must be in some degree changed from what is natural. For instance, if any one who is contorted shall bend himself directly forwards, the flexion produced, although direct with respect to the body, will be lateral with respect to the spine, inasmuch as it shall be rotated: hence the difficulty which most contorted persons feel in stooping forwards to pick up any

thing from the ground, and the reason why they always turn their side to the object wished for, and bend their legs beneath them to reach it.

As the vertebræ, from the nature of their articulations, can only be rotated to a certain extent, it will follow, when the body of a contorted person is bent forwards, that the flexion of the spine, although it shall fall, relatively, a little to the one side, will be chiefly in the direction of its natural flexions. If we observe, then, what changes take place in the apparent curvatures of the spine of a contorted person, when he bends the body, we shall find that they will be increased and diminished in a manner similar to what I have already stated as happening to the flexures of the spine in its natural state, although not in such a perfect manner: that is, if the body be bent directly backwards from the erect position (supposing that the whole vertebræ are rotated), the apparent curvatures of the neck and loins will be increased, while that of the back will be diminished, and *vice versâ* when the body is bent forwards. This change upon the apparent curvatures of contorted persons, during the motions of the body mentioned, I apprehend, could not

take place, did the deformity proceed from direct lateral curvature of the spine.

As the muscles of the back which rotate the vertebræ in the manner described, in cases of spinal deformity, can only do so, on account of their acting at given angles upon transverse levers, and as the vertebræ admit only of a rotatory motion to a certain extent, from the nature of their articulations, it will follow, when the angles formed between the origin and insertion of the muscles become diminished by the movement of the levers acted upon, while the vertebræ at the same time admit of no farther motion from the nature of their articulations, that the muscles will cease to rotate, and the force of their contraction, from their angles having been acute, fall, consequently, towards the perpendicular. From this circumstance, then, the vertebræ ceasing to be further rotated, the force of the contracted muscles is now spent in compressing the vertebræ downwards and laterally. We shall therefore find, from the extensive connexion of the long extensors of the back, which I have shewn to be the principal muscles concerned in producing the deformity, that the whole

column will yield in such a manner as that its natural flexures shall be increased, while the sides of the vertebræ on which the force of the contracted muscles more particularly falls, from their altered position, will be much compressed : hence, in old standing cases of contortion, the reason why the apparent curvatures become so great, and the bodies of the vertebræ, with their interarticular cartilages, exhibit frequently, on dissection, no other marks of disease than what we find in general to arise from unequal pressure, made in a similar manner upon any other bones of the body : and why likewise these marks of compression are so frequently observed on one side of the bodies of the vertebræ only.

That such a compression of the vertebræ of contorted persons as I have described, actually takes place from the contraction of their muscles, I think clearly appears by the following fact, probably not generally known : namely, that many contorted subjects, particularly in chronic cases, will actually stand *an inch* higher, after strong frictions (with oil) have been applied for twenty minutes or half an hour to the muscles of the back, than they did previous to

their application ; and this will be the case even although the patient may have lain for many months in the recumbent position*. This circumstance, in my opinion, it is of importance to know ; for by measuring the patient from time to time immediately before and after frictions, we shall be able to ascertain what progress we are making towards the recovery ; for, inasmuch as the difference of the stature of the patient shall decrease when the measurements are made, so much shall we have overcome the contraction of the muscles of the spine.

There is certainly much variety in this increase of stature in contorted persons after the application of frictions. I have seen some patients who had been only three or four years

* I am perfectly aware, for I have made the experiment, that a person will stand higher in the morning after a night's repose, than he did in the evening before. But in all the cases of contortion which I speak of, and in which the experiment was tried, the patients had been previously confined for many months to the recumbent posture. In one young lady who was not distorted, and who submitted to the operation of friction to the back, I found no sensible increase of stature. The experiment in this case was made an hour after rising in the morning.

contorted gain nine-tenths of an inch, and others again only five-eighths, who had been nine or ten years contorted. In incipient cases it is much less, as, for instance, in children about ten or twelve years of age, and in whom the complaint has not made much progress, it will probably not exceed two-eighths of an inch. This variety may be owing in some measure to the compressibility of the intervertebral cartilages, but I consider it chiefly to depend upon the looser connexion of the vertebræ; on which account they yield more readily to the organic contraction of the muscles. This yielding of the vertebræ appears to me to be the reason why those people who are most contorted in their spines are so seldom subject to consequent structural disease of the vertebræ; for, in this case, the force of the contracted muscles is chiefly spent upon the general yielding of the column; consequently, the pressure on the vertebræ, although sometimes sufficient to excite absorption of a part of their bodies, is not so great as to produce ulcerative inflammation in them. Whereas in those contorted persons whose vertebræ, from their structure, are more firmly articulated, the

whole force of the contracted muscles is received upon the bones in proportion to the resistance given by the unyielding state of the column, and will be greatest in the centre of each flexure. This pressure upon the vertebræ is sometimes so great as to produce ulcerative inflammation in them, particularly when it happens in a person of an irritable fibre. This appears to me, then, to be the reason why in cases of lesser degrees of contortion, we frequently find not only a general tenderness of the whole vertebræ of the spine, but sometimes actual disease in some of them, and more especially in those which are seated in the centre of the different flexures. In this manner, then, I would explain why the upper lumbar, the fifth or sixth dorsal, and the fourth or fifth cervical vertebræ, are more frequently affected with structural disease in rotations of the spine, than any of the others, because of their central situations in their respective flexures.

It must, however, be admitted, that peculiarity of structure with respect to the flexures of the spine will cause a difference in the particular vertebræ which may become the seat of dis-

case; while at the same time, as I have already observed, its appearance in any case will much depend upon the irritability of the person; and is more likely to take place in one who is scrofulous, than in any other, it being well known how little able such a person is to bear pressure in any shape whatever without injury.

It will sometimes happen, when the pressure on the vertebræ is not sufficient to produce læsion of their structure, that such an irritation will be excited in the whole column by it, as to occasion all those obscure, and distressing complaints which are seen so often to harass contorted persons, and which are for the most part ascribed, either to some latent affection of the spinal marrow and nerves, or mistaken for other diseases*.

I had a good illustration lately in a young lady, by whom I was consulted, of what I have advanced, and which, I consider worth noting.

This young lady was sensible that a slight dis-

* There is a young lady under my care at present, who frequently becomes deaf upon standing erect, but recovers her hearing again a few minutes after she lies down upon the relaxing couch.

tortion of her spine had existed from an early period of her life ; but as she was a compact little figure, and her vertebræ, consequently, strongly articulated, her deformity, on this account, did not increase for a period of eleven or twelve years. During the greater part of this time, she was not considered to enjoy perfect health, although there was nothing of which she complained in particular, except what was referable to her digestive organs, until about eighteen months before I saw her, when she was seized with pains and weakness about the back, pelvis, and lower extremities, particularly in that of the left side, with strongly marked symptoms of diseased action in the system. From these symptoms her medical attendant was induced to consider the case to be a disease of the hip joint, especially as he said there was pain on moving the limb referable to this part, and likewise as the lady felt a thrilling pain in the heel of the same extremity. She was treated, therefore, under this supposition, with issues, rest, and other means generally employed in hip cases, for about twelve months, when I was requested to see her. Upon examining this lady, I found that all the symp-

tons indicative of hip disease were no longer present; and although she had the power of moving her limbs, and endured no pain in doing so, yet there was such debility of them and the whole body, that she was unable to walk or stand erect more than a few minutes at a time. Upon looking at the spinal column I found that it was slightly rotated. I, therefore, concluded, that the whole of her present distress arose from pressure made by the contracted muscles upon the vertebræ; and I found it so upon examination: for, upon pressing, with my finger, the vertebræ in the centre of the lumbar and dorsal flexures, she instantly complained of much pain, and shrunk from the touch*. The vertebræ thus affected, as may be supposed now, were the upper lumbar, and fifth dorsal, which, from their central situations in the flexures, and the unyielding state of the column, received the greater share of the force of the contracted muscles of the back, and, consequently had ulcerative inflammation produced in them. There was no particular tenderness in any of the other verte-

* I made the examination in the presence of her medical attendant.

bræ ; nor were those of the neck rotated. As my opinion was only taken in this case, I can, therefore, give no farther particulars of it ; nor do I know the result, for I have not heard of the young lady since. I think it worth mentioning, however, that this lady, very justly in my opinion, ascribed her deformity, slight as it was, although now grievous, to the whim of the boarding-school mistress putting on backboards one year, indiscriminately, upon all the children of the school of which she was a pupil*.

Many cases of this nature are every day met with, and as they counterfeit all the symptoms of hip disease they are frequently treated as such. I shall not, however, go so far as to say that disease of the hip-joint had not existed in the case of the young lady mentioned above ; but in my judgment there was none when I examined her, and that her sufferings at that time arose from the diseased state of the vertebræ.

It has been shewn in the course of these observations, and I hope satisfactorily, that in the

* I omitted to state in this young lady's case that she had been seized with complete *aphonia* more than once during her illness, and recovered her voice again.

slighter rotations of the spine we are to expect the greatest mischief; and no one will deny, that when disease affects the vertebræ, pains and distress in the remotest parts of the body will frequently be the consequence. In all cases, then, in which there is the smallest deviation of the spine from its natural situation, and in which there shall be pains about the pelvis and lower extremities, I would recommend that particular attention be paid to the state of the vertebræ seated in the centre of the different flexures of the column, but especially in the lumbar, for it is more than probable that one or other of them will be found in a state of inflammation.

Indeed when we consider, as I have just shewn, that the spinal column becomes so much compressed by the contraction of its muscles, as in some cases to shorten it nearly an inch, we cease to be surprised at the many instances of diseased vertebræ which occur in contortions of the spine, and only wonder why there are not more. It is owing to this circumstance, the appearance of disease from pressure on the vertebræ of those whose spines have become rotated by the con-

traction of the muscles, that medical men, in my opinion, have considered this deformity, like the curved spine, to depend upon original structural disease of the vertebræ, but the error, from the explanation I have given, will now be apparent. The opinion that this deformity depends originally upon structural disease of the vertebræ, has not only given rise to much false reasoning on the subject, but to the adoption of a practice, which, instead of affording relief, has, in my judgment, only tended to increase the mischief. I allude to the practice of keeping patients afflicted with this malady, constantly extended upon a horizontal or inclined *plane*. But as I shall have occasion to speak of these presently, I shall only now observe, that so long as you continue a cause, so long will you produce an effect. A muscle that has become contracted from position, will never be released from this condition by being kept constantly in a state of contraction.

Of the various diseases which are supposed to produce spinal deformity, in all its shapes, two are generally mentioned,—scrofula, and rickets, or mollities ossium. And although muscular con-

traction has been called in as a powerful agent by many, yet it has been commonly thought that one or other of the diseases mentioned, existed as the primary cause: at least, they have always been considered present, for without their aid, the double or treble apparent curvatures of the column, in cases of what are called LATERAL CURVATURE, could not well be accounted for.

That the spine, as well as other parts of the body, is subject to the ravages of the diseases which I have mentioned, is a melancholy truth too frequently observed; and when it occurs, I apprehend all the powers of art will not prevent the parts from becoming distorted, should they be so inclined, or remove the deformity after it has taken place; for, independent of all the care and attention that can be bestowed, to prevent, by position, any weight of the body bearing upon the vertebræ, the strong inherent contractile power alone of their own muscles, which never ceases to act in one direction or other, will in itself be sufficient to produce the accident: and it frequently happens, from this very circumstance, that during our endeavours to remove the one cause, we only produce the other. But,

independent altogether of structural disease of the vertebræ, their ligaments or cartilages, I hope I have made it satisfactorily appear, that the spinal column can be deformed very materially by the contraction solely of its own muscles ; and that upon the principle of rotation of the vertebræ, produced by this contraction of the muscles, we can account for all the phenomena of that very frequent deformity, so generally supposed to be, and called, *lateral curvature*.

Upon the principle of rotation of the vertebræ, we can explain why there should be the appearance of two and sometimes three curvatures in the column, because of the changed aspect of its flexures. We can explain also why the ribs on one side fall down and are pushed forwards, causing a protrusion of the chest in front, and a sinking in of it behind, and why on the other they are raised up and dragged backwards, causing the enlargement of the shoulder behind, because of their double attachments to the vertebræ. It is upon the principle of rotation of the vertebræ, also, that we can explain why, upon dissection, there are in some cases no other marks

of disease in the bones, than what are known to occur from unequal pressure ; why, in others, there is only a slight diminution of the thickness of one side of the intervertebral cartilages, while the deformity would warrant us to suspect considerable loss of substance even in the vertebræ themselves ; and why, in some, there are no diseased appearances at all. It is upon the principle of rotation of the vertebræ, likewise, that we can account for the frequency of the malady, because of the general adoption throughout the country of the means calculated to produce contraction of the spinal muscles in children ; and explain why so many women and children go about, with no other marks of ill health or inconvenience, than what arises from the altered figures of their bodies ; and why others suffer so severely, and become afflicted with all the miseries of diseased vertebræ, because of the looser connexion of the vertebræ with each other in some persons than in others, and the irritability of constitution. And it is, moreover, upon the principle of rotation of the vertebræ, that we can explain why there has been so much difference of opinion amongst medical men respecting the

complaint, and why all the different means proposed by them, both for its prevention and cure, have availed nothing in the one, and effected as little in the other, because of their mistaken pathology.

SECTION IV.

ON THE PREVENTION AND CURE OF THE ROTATED OR
CONTORTED SPINE.

I COME now to that part of my subject, which I consider of infinite importance to the rising generation ; to that part of it which treats of the prevention and cure of spinal contortion. Of these two very desirable objects, I would say (however others may differ from me), that there is nothing more easy and simple than the former, or more uncertain or difficult than the latter : uncertain, because no one can say *a priori*, whether there be not loss of substance, from continued pressure, in some of the vertebræ ; and difficult, because of the complicated movements of the different bones of the trunk of the body concerned in the deformity.

Although the prevention and cure of the contorted spine is to be conducted upon the same general principle, yet I think it will be better to give each a separate consideration. I shall therefore subdivide this section into two parts.

PART I.

ON THE PREVENTION OF THE ROTATED OR CONTORTED
SPINE.

In making my observations upon the prevention of spinal contortion, I feel it incumbent upon me to say a few words on each of the means now used for this purpose; not so much with the view of prepossessing any one in favour of the mode I myself recommend, as for the purpose of pointing out their pernicious effects upon the spinal muscles, and to shew how much they are calculated to produce the very complaint that they are intended to prevent.

The first of these means which I shall mention, is that observance of POSITION, which children and young ladies are taught everywhere, as a branch, I might say, of their education; that *attention du corps* of the French, that we have, in this imitative age, so faithfully copied.

I have already shewn, that the regular and frequent interchange of contraction and relaxation in the muscles of the human body, is the only way in which they can be preserved in a healthy condition, and that the latter of these

states can be borne, with impunity, much longer than the former.

The unceasing motions of a young child, from the time it rises from its bed in the morning, until it resumes it at the close of day, shew evidently that any restraint upon such activity must be opposed to what is natural; for it is as yet by instinct that a child is actuated, and not by reason. But even at this early period of children's lives, the cares of their mothers and tutors are directed to the preservation of their figures, and the prevention of that much dreaded evil, spinal distortion: and it is with this view that young people are tutored to observe so much the erect position, especially when they sit down to rest themselves, and to be checked on all occasions, should they bend forward their bodies to relieve themselves from pain.

That this position of the body must be injurious to the muscles of the spine I shall humbly submit to all. Let any one sit or stand motionless with the body erect for the short space of an hour, and then let him ask himself whether from his own feelings he would consider such a posture fitted for a tender child. Some, it is true,

may, from custom bear this position longer and with less inconvenience than others ; but to the majority of those who shall try the experiment it will be almost intolerable. What, if such distress then shall be produced by an erect posture of the body in a little hour, in adult age, must be the sufferings and injury which await a female child, who, during the greater part of a ten years education, shall be compelled to remain in this irksome and painful position. Whatever gives pain to the body must assuredly be hurtful to it. How then, this posture (for it is a painful one) can, in children, be supposed to improve the figure of the body or prevent distortion of the spine, to me is quite incomprehensible. Little do mothers think, that, with all their care and solicitude about the carriage of their children's bodies, and their enforcing it by means of restraint, they only make themselves instrumental to the production of the calamity which is so much dreaded by them.

The constant contraction excited in the spinal muscles when the body is retained in the erect position will assuredly not fail, during their evolution to disorganize them. They will in the first

place become enfeebled by it, and rendered unable to support the body: they will waste away, and lose their elasticity; and if persisted in, will become permanently contracted. Thus it is that children who are tutored to observe much the erect position, are frequently unable to do so, and assume those lounging attitudes for which they never fail to be chastized. This severity to children arises from the impression that these postures are the causes of distortion of the spine; and because some have written to say so, it is the more confidently believed. But let me dissuade those who are of this opinion from such a belief, and assure them, that it is not to those lounging postures that contortion owes its origin, but to the continued erect position of the body, which is every where so much insisted on: and that the lounging postures, so greatly dreaded, are, themselves, but effects of the same cause.

I am the more anxious to impress this consideration upon the minds of all those who have the care of children, because the practice of tutoring them to observe implicitly and so strictly the erect position of the body as a certain means of preventing contortion of the spine, is now

widely diffused throughout the country : and because it has led to the adoption of the various other supposed preventive means, every where so much in use, but whose effects upon the human body are, in my judgment, pernicious in the extreme.

The position best suited for children should not be dictated by others, but be that which to their own natural feelings seems most pleasant : and be assured, that no child will remain longer in any one position than what is agreeable and comfortable to itself, and that although it might indulge in, and tolerate one much longer than another, yet restraint in any would become both irksome and hurtful to it. I would therefore strongly urge the forbearance of placing any restraint whatever upon the actions of children as to position, and condemn the practice become now so general of causing them to observe so strictly the erect posture while sitting or standing, as a powerful agent in disorganizing the muscles of their tender backs, and contorting their spines.

From the difficulty experienced at all times, as I have observed, in enforcing obedience from

children, it is, that recourse is had to some instrumental means of forcing them into the observance of this ill-judged position, under the strongest conviction of its validity, as well as necessity; and the first of these which I shall notice in order, are what are called,

Education Chairs.—This chair, become every where so general, has for its object the keeping of children's bodies upright, and most effectually does it do so. The smallness of its seat, the length of its legs, and the uprightness of its back, are most effectual preventives of its little occupant bending its body in the smallest degree; for if it should attempt to do so, it must inevitably be thrown forwards with its face upon the ground. Simple as this chair may appear, and however it may seem divested of pain or restraint, yet it is far from being freed from either, when a child is made to occupy it so much as is frequently done. But the principle on which this chair acts, is, in my opinion, a bad one; for, by keeping the body of the child constantly erect, and without motion, the extensor muscles of the back are made, as I have pointed out, to suffer disorganization: and, therefore, independent of

the distress which the child must ever suffer from being confined to one position, instead of its being a means of prevention, it becomes a powerful agent in the production of spinal contortion.

The chair which I would recommend for the prevention of spinal contortion, and indeed for all children, should be exactly similar to those in common use for adults, and what we see in almost all drawing rooms, made in proportion to the child's age. The bottom of the chair should be broad and deep, the back gently hollowed towards the lower part, and the seat of that height which will allow the child's thighs and legs to form a right angle, when the feet are placed flat on the ground. And while I recommend such a chair as this, I would at the same time insist that the child be allowed to sit upon it as best suits itself, for in this I think it is the best judge*.

Chairs are chiefly for children who are educated privately, and cannot well be used in public schools; but I would recommend that the forms made use of in such places, be made after the

* A graduated chair of this description would serve a child through all the stages of its growth.

manner of these chairs : that is to say, in proportion to the age of the children who occupy them, their seats should be deep, *and somewhat softer than wood**: they should all have backs (not upright ones) like to what I have recommended for the chairs, and the seats of them should on no account be made higher, than what will allow the children's feet, when they sit down, to rest firmly on the ground. A seat of this kind, without restriction as to the manner in which children should occupy it, will, in my judgment, do more for the preservation of girls' figures, and the prevention of spinal contortion, as well as disease, than all the complicated machinery in the country, and much more so than what is generally supposed, if we are to judge at present from its total prohibition.

* For my own part, I do not see why a female child should not have a stuffed-bottomed chair or seat to sit upon, as well as an older person. It certainly can do it no harm, while a hard bottomed chair or seat may ; for, should there be any disposition in the child to mollities ossium, the outlet of its pelvis, if it be compelled to sit much upon a hard seat, may be materially misshapen ; the evil consequences of which, in the married state, would fully warrant us, I think, in preventing its occurrence if possible.

Stays.—While this very common article of dress is used as such, it is at the same time resorted to as a mean of prevention of spinal contortion.

When children are supposed to be weak in their backs, which they never will fail to become, so long as they are tutored to sit or stand so much in the erect position, but more especially if they are seen to lean to one side, a certain consequence likewise of the same cause, it is the common custom to put them into stays, for the purpose of giving support to, or propping up the body, as it is called. Now according to the above principles nothing can be more pernicious than this very common but mistaken practice: for if stays be made use of to prop up the body, they must of course be laced tight round it to do so. They, therefore, become hurtful in a twofold manner, both in respect to position, as well as pressure; the ill effects of the latter I have pointed out in a foregoing section.

It would be in vain for me to attempt to dissuade ladies from the use of this pernicious article of dress: but however much they may disregard themselves in this respect, they certainly ought

not their children : for I consider it to be as much their bounden duty, while their children are unable to judge for themselves, to reject whatever shall be hurtful to them, as it is to adopt that which is beneficial. As there is nothing, then, which can injure a child's health, or be more likely to distort its body, than restraint in any shape, during its growth, so there is nothing more likely to improve the former or prevent the latter, than the free use of all its members. A child, while it is rearing to maturity, requires no support from dress, but the freedom and exercise of every part of its body. The Ethiopian exposed in his sandy deserts, and the American Indian sheltered in his wooded wilds, know no support from stays, neither do they fetter their children with any embarrassments of dress ; yet do they grow up in the shape of man, and their females are strangers to contortion of the spine ! A mother, therefore, ought, in every instance, to be careful in imposing upon her tender offspring what is not only unnecessary, but hurtful. But the notion that the bodies of female children require to be supported, by some means or other, during their growth,

has become, by time and custom, so firmly rooted in the minds of all mothers, that it would be a difficult task for me indeed to persuade them to the contrary, nor is it my wish to do so, farther than to beg of them, if they have any wish to save their children from distortion, and preserve their health, that until their bodies be *fully* matured, they refrain wholly from the use of stays, especially those that are in any way stiffened with whalebone or steel, and make use of simple bodice only, which will allow the free motion of their spines in every direction. I would, moreover, recommend that such bodice be made of something elastic, otherwise, as much attention cannot at all times be given to their adjustment, they may be frequently made to press too much upon the body, and impede its motions, which will never fail to be injurious*.

* The stays which I recommend for young ladies (children require none), consist of the fine white woollen stocking web, such as is used for gentlemen's pantaloons. The web, doubled, is cut and formed into stays, in the same manner as any other material; and instead of bones or steel being added to them, there are strips of jean stitched closely down on both sides, in the places where these injurious bars are generally put. The strips of jean, stitched in the manner described, give suffi-

In this manner, if they will have it, a comfortable support may be given to the body, without much risk of injury to the spine, for its motions will be unconstrained by this precaution. But as few content themselves with this simple support, conceiving it to be insufficient, they have in general recourse to stays that contain whalebone or steel, placed in the most effectual manner that can well be contrived, to prevent the natural flexion of the spine. A child whose body is thus cased, independent of the uneasiness it must ever experience by such restraint, manifested frequently by the shrugging and working of its shoulders, must suffer injury from constant position. The muscles of the spine, from being kept constantly in a state of contraction, and never permitted the interchange of relaxation, will as a certain consequence become disorganized, and produce deformity of the spine

cient firmness to the stays, while the elastic web between them admits of the free motion of the body in all directions. As neatness in this article of dress is of importance, if it be thought proper, the bosom part, which supports the mammæ, may be made of jean, as usual. To elasticity, these stays combine warmth; a thing of the greatest moment to young females.

in the manner I have pointed out ; so that, instead of stays being a mean of prevention of spinal contortion, they evidently become a powerful assistant to its production.

Crutches, as an appendage to stays, are made use of by some people, and are either fastened to the stays themselves, or applied over them with straps to go round the body. Sometimes they are made to rest upon the pelvis. But as they are more frequently resorted to as a mean of cure in spinal contortion than of prevention, they will be farther considered under that head.

Collars* may likewise be considered an appendage to stays, for it is to them that they are generally fastened ; but of all the contrivances with which children are tortured, I sincerely believe none in severity can rank higher. I consider it almost superfluous to say, for they are pretty generally known, that this pernicious instrument consists of a kind of crutch proportioned to the age of the child and the length of its neck, fastened to the fore part of the stays, and made to take the lower jaw somewhere about its angles. This is the

* This is a very different instrument to what is, under the same name, used for the cure of spinal deformity.

more simple form : but I have known a piece of sharp pointed steel made use of, placed so immediately under the chin, that should the child attempt to bend its head or body in the least forwards, it must be inevitably wounded. Some again attach a kind of ridicule to the instrument : they fasten, upon the upper end of a steel rod, a carnation or some artificial flower stuck full of needles as a *nosegay*, leaving the poor child the choice of one of two evils : either to bear the agonies of an aching back, consequent to the continued erect position, or, in evading this, to prick itself with the needles concealed in this *bouquet ridicule*. But however ludicrous such a practice may appear to those around, and whatever sport may be made of it by them, it is far from being harmless to the suffering child : and in point of torture, I would say, that no tribunal could inflict a greater, with so little appearance of its being a cruelty. How unfit then is this instrument for a tender child, and how destructive must its effects be to the muscles of its spine—and yet how general is its use !

Steel bodice are now to be noticed under this head, for they are nothing but stays with steel

bars instead of whalebone, made by a surgical bandage-maker, instead of a common stay-maker. Those which are now made to lengthen and shorten are the most approved of. I certainly will give the person, whoever it was, credit for the invention ; but as they act upon the same principle, and probably with greater effect, as the common stays, I consider them highly pernicious at any period of a young lady's life, and more especially as a preventive of spinal contortion.

Back-boards. These from what cause I know not, unless it be that they are superseded by the inclined plane, are happily not in such general use as they were formerly ; but as they are still employed by some people for their children, I think it proper to notice them. It was formerly supposed, that the diameter of the chest was considerably narrowed by stooping the body forward, and, consequently, that much of our pulmonary complaints was attributable to this cause. For the purpose, then, of guarding against this, it was that back-boards became so much in vogue, and as they are pretty well known I think it unnecessary to give any description of them. They are intended to keep the bodies of children up-

right and the shoulders back, and surely no one will dispute their power of doing so. The sufferings which children always endure from this galling instrument would, in my opinion, be sufficient to condemn its use : but as it keeps the body constantly in the erect position, it becomes a powerful means of disorganizing the spinal muscles, and consequently of contorting the spine, which the intention of it is to prevent.

Some back-boards have a collar or yoke attached to them, which clasps round the neck to prevent the child from bending its head as well as its body. But if the more simple kind, such as I have mentioned, are bad, those with this addition must be much worse.

Braces act upon the same principle as back-boards, and probably with equal effect when they have a *weight* pendd to them behind, with the view of keeping the shoulders down, which is sometimes practised.

Stocks. These are wooden sockets to receive the feet, placed so as to form with each other an obtuse angle, and in many cases a straight line. The intention of them is to make the child turn out its feet in walking, and pro-

ably they may have some effect in doing so : but I have reason to know, that their use has been followed by a different result, and children made to walk upon their ancles, in consequence of the debility produced in the muscles and ligaments of their joints by such an unnatural position.

This may be considered a digression from our subject, and I grant it is so ; but when we find that children are placed in stocks, with their backs straight against a wall, door, or flat board, for the purpose of improving their figures, and preventing them from becoming crooked in their spines, the case is then altered, and, I think, fully entitles them to a place here for condemnation, as well as those means which I have already mentioned. For although they are scarcely ever used alone for this purpose, but conjoined with some other contrivance, as a collar, back-board, or such like ; yet they are commonly placed so close to the wall or board, that in themselves they pretty effectually keep the body upright, the pernicious effect of which, I have already so often stated, that I need not here again repeat it.

Reclining Beds. These beds, although originally intended for the cure of spinal contortion are now used for its prevention, on which account they are to be considered in this place; but as some are more simple than others, I shall confine myself here to the former, being those which are usually employed as a preventive, leaving the consideration of the latter until I come to speak of the cure.

These beds are nothing more than horizontal or inclined planes made of wood, covered sometimes with green baize as an indulgence, on which the child is stretched at full length upon its back, without a bolster, for the greater part of the day, a discovery seemingly made by those, who, from economy, substitute the floor for this purpose.

Were I to be asked my opinion respecting these two planes, the horizontal and inclined (which, by the by, with respect to the position in which they keep the body, are quite the same), I confess I should be puzzled to say which of them I think most objectionable, except in point of uneasiness, when I would most certainly give the palm to the inclined.

Any one who will take the trouble to examine

into the state of the muscles of the back, while the body is stretched upon either of these planes, the horizontal or inclined, must plainly perceive, I think, that they approach nearly to the greatest degree of their organic contractility; and that it is quite impossible for them to be in the slightest manner relaxed, so long as the person continues in this extended position. How long children are made to occupy these planes every day, is best known to those who impose such a restraint upon them: for my own part, I have known them made to recline, in this manner, for six or seven hours, and in some instances much longer.

I would only ask what a person would reasonably expect, were he to lay his limb upon a flat board for the same length of time every day, and, when he got up, that every precaution was taken by splints of whalebone or steel to prevent him bending his joints? Would he not expect, by such treatment, that the muscles of his limb would become contracted? And if so, would he not expect that the same would happen to the muscles of the trunk of the body, if it were treated in the same manner? These are reflections,

which those who make use of such planes for the prevention of spinal contortion, would do well to consider. For my own part, I hold them to be as ill judged and pernicious a contrivance for the prevention of contortion of the spine, as could well be devised : for, by keeping the body constantly extended, all the muscles of the spine, at least all the extensors, remain quiescent in the greatest degree of their organic contractility : which condition of a muscle, if long continued, I have shewn never fails to disorganize it. So, instead of ranking these planes amongst the means of prevention, I would most certainly place them amongst those of contortion. But I will even go farther than this, which I shall notice again when speaking of the cure, and say, that if a person be made to occupy either of these planes *constantly*, which is sometimes done, it will, in my opinion, paralyze the lower limbs.

Beds. Such is the ardour with which some prosecute the pernicious custom of keeping children from bending their backs, that the very beds on which they lie down to repose themselves at night, and in which the only hope of relaxing the wearied and contracted muscles of their

spines can be expected, are carefully constructed now to prevent the desired effect.

The old and salutary custom of having sacking at the bottom of children's beds is now by some people done away with, and laths substituted in its place: and instead of there being a well-stuffed and comfortable mattress, that will yield to the body, there is one so hard as to be little better than the boards on which the child had lain the greater part of the day. While the careful nurse, who always looks at her children before she herself goes to rest, would be terrified almost to death, were she to find any of them lying with their bodies bent, and would carefully change them from the position which nature had instinctively led them to assume for that which is dictated now by fashion. Such a procedure is, in my opinion, highly wrong, and not at all justified even by common observation. The position which children instinctively assume when they lie down to rest, and indeed the whole species, approaches to that in which they lay while *in utero*, and which, I conceive, admits of the relaxation of more of the muscles of the body than any other. The trunk and head are bent

forwards, the knees drawn upwards, and the legs carried towards the back part of the thighs, while the arms being bent occupy the space between the head and knees. This position is certainly the most natural as also the most grateful; were it not so, it would not be so generally and instinctively assumed by us. But as this, as well as any other position, will become irksome and painful if long continued, so will it be changed for some other, whether asleep or awake, the moment it is felt so. Little apprehension then may be entertained of a child becoming distorted, in its spine or any other part of its body, during the short time it is relieving itself agreeable to nature, by any position which it may assume during its slumbers; for be assured it will not remain long enough in it to do so.

Drilling. This differs very materially from what is commonly called school-drilling, of which I have given, I think, a very good and fair specimen. It is what was used formerly to be taught by a dancing-master at the dancing-school, but is now become the province of some veteran drill-sergeant; and consists of marching children round a room, and putting them through their

different facings, after the manner of soldiers, by way of exercise.

This certainly is by far the most rational of the modern means that have been adopted for the prevention of spinal contortion, and the preservation of children's figures ; but I will venture the opinion, and say, that it will not value one single iota in effecting either of these, so long as the other modes and customs are at the same time practised. Of what avail will an hour's marching and wheeling about be to a child, if, for the remaining part of the day, it be stiffened up in some of the contrivances which I have mentioned, or be stretched out on a reclining board or hard school-room floor. The pernicious effects produced by these restraints upon the muscles of the spine, from their being retained in a constant state of contraction for twenty-three hours every day (for I have shewn that children's bodies are now kept extended by night as well as by day), are not likely to be counteracted by the slight oscillations produced in them by the marching and wheeling of the body for an hour in the forenoon at the command of a drill-sergeant. But if school-drilling, and the different instruments used

in it, be wholly laid aside, and shall give place to the sergeant's, then I consider it may have a good effect : but if not, and the child be drilled by its tutors after their fashion, I would consider it not only useless but hurtful, for in this case it would only become an additional restraint upon the muscles of the spine and trunk of the body, already made to suffer too much from this cause.

When we come to survey this long list of instruments, and the means so universally used now for the fashionable man's children, we cease to be surprised at their bodies being so frequently and miserably deformed, and only wonder how it is that so many escape this calamity.

It affords us a striking example, I think, of the wonderful efforts of nature to resist the effects of such pernicious instruments ; and I consider those children who are reared now to maturity under their use, without being contorted in their spines, only as so many miraculous instances of escape : and even should they be so fortunate, how unfit are they for the fatigues of the fashionable life, on which they are about to enter ! Young ladies whose bodies, during their education, have been unnaturally constrained and stif-

fened in the manner they now are, can little bear the exertion and fatigues attendant upon our fashionable amusements. Muscles which have scarcely been allowed motion, and which have become rigid by constant position, cannot but be materially injured when they are thrown into such strong action, as they must necessarily be, when a young lady strives to excel in a fashionable dance. Now it is that “the various turns and gesticulations of the body” will tell home upon the rigid and contracted muscles of their spines, and “the articulating fibrous structure to which they are attached” stretched, in such a manner as to bring disease upon the vertebral joints and bones; yet do these consequences not change the primary feature of the complaint.

How many are the examples of young ladies, who, after the fatigues and exertion of dancing a whole evening, at some ball or splendid entertainment at which they have made their debut, have returned to their homes to pine away upon inclined planes, under all the sufferings and miseries of spinal disease; and been carried off by this cruel affliction, ere they had scarcely tasted the sweets of life!

In giving, thus, my sentiments and opinions so freely respecting the different means that are in general use at present, for the preservation and improvement of the human figure, I hope it will not be considered that I have condemned any of them hastily or through prejudice ; for I have shewn that all of them, singly or combined, tend to prevent an essential part of the function of the muscles of the spine from being performed, absolutely necessary for their well being as well as the spinal column itself, which is simply the interchange of relaxation. And until it be proved satisfactorily, that this is not an essential and indispensable part of a muscle's function, I shall be tenacious of my opinions.

Whoever wishes to preserve his limbs from deformity, and prevent their muscles from becoming contracted, will naturally perform their flexion and extension frequently and daily, and whoever shall wish to preserve the trunk of the body and its muscles from the same evil must assuredly do the same.

What would be said of the man, who, to give symmetry to his legs, because some one amongst his acquaintance had his withered and distorted

by a scrofulous or ricketty affection of the bones while he moved about, should ease them in laced stockings and lay them stretched upon a board? Would he not be derided and accused of folly, and the sanity of his mind even called in question for such a procedure? And what if the muscles should become contracted and his limbs distorted, would it not be considered a just retribution for his violating so grossly the laws of nature? Yet is that person more judicious or humane, who, to preserve and give symmetry to a child's body, shall case it in stiffened stays, or otherwise restrain it, and lay it down stretched upon an inclined plane or the floor of a room, because some friend or acquaintance had a child that became deformed in its body by a scrofulous or ricketty disease of the bones of its spine, or rather perhaps by some improper treatment. Let me tell those who have children to rear, that, if they wish to preserve their figures and ward off disease, they must adopt a very different plan of treatment for them than this: and until they do so, that contortion of their spines, with all its calamitous evils, will continue to haunt their dwellings, and be visited upon their helpless and misguided offspring.

To prevent children, then, from being mutilated by this cruel deformity, let those who have the care of them cease to restrain the position of their bodies in any manner whatever. Let that *attention du corps*, that mania, for it deserves no other name, for training them to sit constantly erect, be wholly laid aside: let the cry of *hold your head up, and keep your shoulders back*, be as seldom heard in the chambers of the splendid mansion, as it is in the lowly cottage; and let all those vile instruments and means so much now in use amongst children which I have mentioned, and others which may have escaped me, no longer find a place in the dwellings of the wealthy. Let children, while nature is yet maturing their tender bodies, be wholly unfettered; let no stays (for they require none) be imposed upon them, neither let them be trained to the constant observance of any particular position, but let them have a comfortable chair or seat, with a back to it, such as I have described, to sit down upon when they feel disposed, and let them lean to the back of it, for it is beneficial that they should do so. And, should their frames be delicate, let them be indulged with a sofa when they are inclined to rest their wearied bodies; but let them not be

stretched out upon it in the manner they now are, upon an inclined plane, for it will only increase their debility : but let them lie with their heads raised, and their bodies and spines gently bent, or in whatever other position nature shall instinctively point out ; for, rest assured, it is the only way to relax their wearied and contracted muscles, and recruit their exhausted strength. Let them not be penned up in the house all day, trusting only to the exercise which their muscles and bodies shall receive at the command of a drill-sergeant, to preserve them in health, and prevent them from becoming contorted in their spines ; but let them sally forth, two or three times a-day, to breathe the open air, and exercise, with vigour and activity, their stiffened limbs ; and when they do so, let them not forget that their spines have joints, and muscles to be moved and exercised as well as their limbs. Let them be permitted to toss a ball, or some such thing, and pick it up from the ground when it falls, that their spines may be used in the manner that nature intended. Let their bodies be bent forwards and extended, and extended and bent forwards again, for it is by this simple motion of

their bodies alone, that their spines will be preserved in health and strength, and retain their symmetrical and natural form; the neglect, or rather the denial and prevention of which, is the principal, nay, I would say, the only cause of all this deformity now in our land. And, when they return home from such an innocent and healthful sport, let not its wholesome and sanative effects be done away with, by placing them immediately upon a music stool, or education chair, but let them sit down to rest themselves, for half an hour or longer, if it shall be required, upon a comfortable seat, in the manner I have recommended, to recruit the muscular strength and energy which have been expended in their little sportive exercise, when they will again return to their scholastic duties, cheered in their minds, and refreshed in their bodies.

Such, then, I would recommend, as the surest means of preventing spinal contortion in the female youth, which is as simple as it is natural, and within the reach of every one. It is the unconstrained, and natural exercise of the muscles and joints of the spine, that preserves the male children from this deformity; it is what, happily,

also excludes it from the children of the poor, and it is alone that which will prevent it in the daughters of the rich. As to the figure of the body when it is matured, whether it shall be graceful and well formed or no, rests with a higher power. Let the bodies of children, then, be on no account interfered with, but let nature complete the work she has begun, and be assured that we shall seldom have reason to complain of the result.

Mr. Pott, whose memory I respect, and for whose opinions I entertain the greatest deference, has left us a lasting memorial of his conviction of this truth which I have advanced. When speaking of the different instruments used for the prevention of distortion of the spine, he says—"they are used with design to prevent growing children from becoming crooked or misshapen, and this they are supposed to do by supporting the back bone, and by forcing the shoulders unnaturally backwards: the former they cannot do; and in all cases where the spine is weak, and thereby inclined to deviate from a right figure, the latter action of these instruments must contribute to, rather than prevent such deviation, as will appear to whoever will, with any

attention, examine the matter. If, instead of adding to the embarrassments of children's dress by such iron restraints, parents would throw off all of every kind, and thereby give nature an opportunity of exerting her own powers; and, if in all cases of manifest debility, recourse was had to friction, bark, and cold bathing, with due attention to air, diet, exercise, and rest, the children of the opulent would, perhaps, stand a chance of being as stout, as straight, and as well shapen as those of the laborious poor."

Happy would it have been for the children of the opulent, had these precepts of Mr. Pott been followed, in preference to the speculative opinions of those who have sprung up since his time. All that misery and distress might have been prevented in those innocent females, whom we see laid down now, in every corner of the land, to pine away upon inclined planes under all the sufferings of spinal contortion. Many a valuable life also might have been prolonged; and the tears of disconsolate parents, mourning yet for some favourite or only daughter, of whom they have been bereaved by this cruel deformity, wholly prevented. But Mr. Pott's are not the

only wholesome precepts that have been disregarded and rejected through obstinacy. This indifference, so far as it regards the individual, would be immaterial, but I maintain that it is very different as it respects others; and that the opinions of one man ought not to be superseded by those of another, unless it be shewn, upon more *rational* grounds, that they are preferable. Nor ought they to be so, even though, to give them the face of probability, they should, instead of being contained in a single paragraph, be swelled to the size of an octavo volume; illustrated, *pro formâ*, with two or three dozen cases at the end, carefully drawn up to meet the author's views, but which stand only as so many living witnesses to record his errors.

While I recommend this freedom and liberty to children during the growth and evolution of their bodies, I do not mean that attention to their demeanour should be altogether neglected; on the contrary, I should wish to see grace and elegance adorning the person of an accomplished female, as well as good sense and a cultivated mind: but I abhor and condemn the practices so generally resorted to for such an attainment, and

consider them, as I have already shewn, to be the principal cause of spinal contortion.

Children are taught to dance and sing, as well as to play the piano, in which they excel or fall short just as nature has gifted them; and there can be no sufficient reason why they should not be taught to grace a ball-room, or even a public promenade, by an elegant and pleasing deportment. Yet a young lady, because she is taught to sing, is not always singing, nor is she always playing the piano because she has learnt her notes: such a procedure would not only be indecorous, but would prove both irksome and hurtful to her; neither, then, should she always keep her body erect, because she is taught by an ill-judging and ignorant dancing-master or governess, that such is a becoming position. It is at best but an artificial and fanciful taste, and, therefore, ought to be taught and practised only as other acquirements merely ornamental are; for it will assuredly prove as hurtful to the trunk of the body, particularly of a delicate female, if injudiciously persisted in, as too much singing would be injurious to the tender lungs which are contained within.

I have said that emaciation of the back, and trunk of the body, is the first indication we have of approaching contortion of the spine. Whoever, then, shall find such an appearance in any of their children that are otherwise healthy, or in whom no particular disease is present which would, satisfactorily, account for such a state of their bodies, should instantly take the alarm for their safety; for it is a certain sign, that all is not well with the muscles beneath, and that the organic disease or contraction, which is ultimately to contort their spines, and otherwise disfigure their bodies, has already commenced. That such is the case with many hundreds, at this present moment, I am well satisfied; and, although their spines are in the most imminent danger of being contorted, yet is there a hope remaining of their being preserved from so dire an evil.

Let the children, then, in whom this appearance of the back has evinced itself, be instantly freed from all and every kind of restraint and embarrassments of dress. Let their stays be thrown off, and their education chairs laid aside, and, should they have been laid down upon reclining boards, or be fettered with galling instruments,

let them rise from the one, and be released from the other ; and, instead of such restraints, let them enjoy the free and uncontrolled exercise of their bodies. Let the muscles of their backs be relaxed by every means that are known to be good for muscles that are contracted. Let frictions be applied to them two or three times a week, or every day, should it be found necessary, and that with oil too, after the manner I have recommended for the cure. Let the joints of their spines be exercised and motioned by the frequent and daily flexion and extension of their bodies, by means of the simple contrivance I have invented for the purpose hereafter to be described ; for it is the want of this natural motion of the spine, the want of the proper exercise of the function of its muscles, which is wasting and contracting them. And let them, after this exercise, lie down on a comfortable sofa for an hour in the manner pointed out, or upon the couch which I have invented, and make use of, for the cure, in order that the contracted muscles of their spines may be further relaxed. Let them, likewise, when they wish to rise from the recumbent position, be provided with a chair or seat to sit

down, such as I have described, and let them lean to the back of it, and enjoy that natural sinking down of the body within itself, which seems to be so essential to the preservation of the spinal column and its muscles, but which the young fashionable, now, knows not what it is to enjoy.

If this sinking down of the body within itself, the protrusion backwards of the loins, be allowed under proper restrictions, that is, if it be not injudiciously persisted in, but alternated with the proper exercise and motioning of the spine at intervals through the day, it will not only prove a safe-guard to the spinal column at all times, but will contribute, with the means that have been mentioned, to the recovery of the muscles of the back, from the contraction which has already commenced in them, and wasted their substance, and which, if not removed, would have eventually contorted the spine.

Let this release, then, be given to the bodies of children whose backs manifest the appearances described; and let the means recommended be assiduously attended to, and persevered in, and there need be no fear of contortion of the spine; for the spinal muscles will, by this proper exercise of their functions, be again restored to their

natural and healthy condition, and enabled, through the vigour imparted to them, to support the drooping body.

PART II.

ON THE CURE OF THE ROTATED OR CONTORTED SPINE.

The differences of opinion which have existed amongst medical men in every succeeding age up to the present period, respecting the pathology of this interesting and dreadful deformity, is the reason that so many and opposite modes of practice have been at different times recommended for its cure : each being suited to the particular notions of its respective author. But laying aside the more hypothetical of these opinions, the great struggle, at present, respecting the proper method of cure, seems to lie between those who suppose it to depend upon muscular contraction, and those who suppose it to proceed from structural disease of the vertebræ, centring in the manner in which the apparent opposite curvatures of the spine are supposed to be produced ; the one party not being able to get rid, altogether, of structural disease, while the other cannot exclude from their premises muscular con-

traction. This is the difficulty which has hitherto presented itself; but which I have now surmounted, I hope, upon philosophical, as well as anatomical principles :—shewing, that what have been all along considered curvatures of the spinal column, is but a changed aspect of its natural flexures, which are brought into profile, or rather semi-profile, by the aggregate rotatory movement of the vertebræ upon each other; the consequence of the permanent contraction of the muscles that move them, produced by mal-position. And that, therefore, medical men have been striving all along to account for what does not exist; the whole being a visual as well as a manual deception.

In consequence of this deception, those who lean to the side of muscular contraction, have been prevented from following up with vigour what is known to them to be useful in such cases, through the dread of structural disease of the vertebræ. While those, on the contrary, who suppose the complaint to proceed from structural disease, have disregarded altogether, the contraction of the muscles consequent to continued position, leaving the patient between the two opinions to become the victim of an increas-

ing deformity. It is to be hoped, however, from the explanation I have given of the complaint, in the course of these observations, that these differences of opinion will no longer exist; and that both parties will unite their endeavours with mine, and promulgate what appears, upon the principles advanced, to be most effectual for arresting this growing evil in our female youth.

As the production of spinal contortion has been accounted for purely on the principle of muscular contraction, so must the cure be conducted solely on that of muscular relaxation. But before entering into this particular, I shall say a few words upon each of the different methods now in use for its cure: all of which, I think, will appear quite inadequate for such a desirable end, to whoever will give them the least consideration.

Several of the means mentioned, which are resorted to for the prevention of spinal contortion, are likewise employed for the cure. But as I have already shewn their pernicious effects in the former, I shall exclude them as being injurious in the latter; noticing, however, the two which I have promised: and conclude with

the consideration of those which are exclusively employed in it.

Crutches.—When stays, notwithstanding all the bones that can be put into them, are found inadequate to support the body of a contorted person erect, and that it is still seen to lean to one side, it is not unfrequent that a crutch is fastened to them on that side to which the body leans. But as many consider one less effectual than two, so another is, frequently, added to the opposite side. This is done with the view of propping up the body as it is called, and a most uneasy prop it is. Some ladies, from this reason, and that they should not be encumbered the whole day with such an inconvenience, while they trust to some other contrivance at home, only put them on when they go abroad. In this case the crutches are fastened with straps which go round the body; while others rest upon the bones of the pelvis: a cloak or shawl being thrown over the shoulders to conceal them.

It evidently appears, that the intention of these crutches, is to assist with the stays in keeping the body perfectly extended; and when they are di-

rected to be worn constantly, it is under the impression, that the softened bones of the spine, from their being relieved from the pressure of the upper part of the body, in the course of time, and through nature's efforts, will recover their solidity; and that in this manner a permanent cure may be expected. But it seems to be wholly forgotten, that, by the use of these crutches, the muscles of the spine are prevented from being relaxed; and consequently, from the body being always retained in the extended position, that the contraction which has produced the deformity will be materially increased in them.

Crutches are recommended, likewise, by those who, to cure spinal contortion lay their patient down upon a horizontal or inclined plane, as an efficacious means of preventing a relapse, when permission is given to the person to rise and walk about. But for such a purpose, they are, in my opinion, and for the reason given, as objectionable or even more so, than as a mode of cure.

Reclining Beds, or the Horizontal and Inclined Planes.—From what has been already said of

these planes as a means of prevention, the reader may easily anticipate my opinion of them as a means of cure.

When these planes are resorted to for the cure of spinal contortion, it is under the idea, that the bones of the spine have become softened by structural disease. In order, therefore, to take off the pressure of the superior part of the body from the diseased vertebræ (which it is natural enough to suppose would increase the curvatures, were this the case) it is, that patients are laid down on planes, stretched at full length upon their backs. In this position they are instructed constantly to lie, until nature, by the changes she is ever supposed to be working in the system, effects a consolidation of the softened bones. At the same time it is considered the most favourable posture, for the spine to recover its natural position. By way of remark, *en passant*, I may observe, that however favourable such constant confinement may be for softened bones, it is certainly the most unfavourable for contracted muscles.

Many, however, not being satisfied with the slow progress which nature is making, it is supposed, in the cure, by the simply reclining of the

body upon these planes, attempt to assist her in her operations by extension: just as the back bone were like a telescope, which can be drawn out at pleasure to a certain focus to suit the eye, and retained there. But whatever may be their notions on the subject, certain it is that extension is used by many, and that differently. I shall at present refrain, however, from speaking of any other mode of making it than what is afforded by these beds.

The beds which combine extension with the recumbent position, are of two kinds, so far as I am acquainted, and are both graduated, so that the plane on which the patient lies may be made, at pleasure, either horizontal or inclined. But, as it is the latter of these which affords the extension, so it is that which is generally resorted to when such assistance is required.

The first kind of these beds which I shall notice is simply a board with an iron hook at the top of it, to which the patient is slung by the head. The other consists of two boards, the uppermost of which is made to slide upon the undermost by means of little rollers; and there is an iron hook at the top of the latter, to suspend

the head to. To the uppermost board there is appended a weight, which drags it downwards upon the principle of a common jack-stone, a groove being cut in the undermost for the purpose. The patient, slung by the head, lies upon her back on the sliding board, which she allows to run down by slacking a cord which she holds in her hand. In this manner a constant dragging of the body is kept up, equal to the weight appended and the gravity of the body itself, lying on a moveable inclined plane, and ordered to be persevered in as long as the patient can bear it.

It will be plainly seen, that, by this contrivance, the whole extending force must fall upon the articulation between the head and atlas, and those of the neck; and that little or none can be exerted upon the dorsal and lumbar vertebræ, for which it is intended. But as I shall have occasion to speak of the effects of extension presently, I shall confine my further observations on these planes, to the position of the body which they are intended to preserve, the pernicious effects of which, on the spinal muscles, I have already shewn.

When these planes are used as a means of pre-

vention, the patients are not so strictly confined to them, as when they are employed as the means of cure. In the latter case, they are made to occupy them constantly. When we examine the back and spine, as the patient lies upon either of these planes, we find that the lumbar and cervical flexures of the latter are increased nearly to their greatest extent, and, consequently, the spinal muscles (the extensors) fully contracted, just as if the body were in the perfectly erect position. From this circumstance, the points of contact of the whole body, are only the occiput, scapulæ, sacrum, and heels; the calves of the legs slightly. The whole weight of the body, therefore, is received upon these points of contact, and that of the trunk, in particular, upon the sacrum and scapulæ. But where there is contortion, and the ribs of one side project backwards, the weight of the upper part of the trunk is received, principally, upon the projecting ribs, and edge of the scapula of the same side, made to turn backwards from the deformity.

Those who have doomed young ladies, that have become the victims of spinal contortion, to pass their time upon these boards, under the fal-

lacious hope of their being restored to their former figure, by such constant confinement, must surely have heard them, I think—and, I hope, with some degree of sympathy—bitterly complain, sometimes, of the distress and pain they endured, in some of the points of contact of the body which I have mentioned; although delicacy may have caused them to conceal that in which it was greatest, but which I shall here pronounce for them, to be the sacrum. And any one who has taken the trouble to examine the backs of such patients, must have observed, likewise, that these points of contact had been kept in such a state of irritation by the pressure, as to have had pustular eruptions produced in some of them, to the great annoyance of the unfortunate sufferer. The pain and distress which I have known produced in some delicate and irritable females, by this mechanical pressure upon the sacrum, have been, in some instances, quite intolerable; and the numbness induced in the lower extremities, so great as to deprive them of their locomotive power. This numbness of the lower extremities, which, in many cases, takes place some months after a patient has been laid down upon

these boards, is, for the most part, considered, nay, said to be, the consequence of the disease of the vertebræ. It may be so when disease is present; but I maintain, that it cannot be the case when no disease exists : and I will venture to say, that where one young lady is laid down upon boards, whose spine is diseased, there are fifty laid down whose spines are not : although they may become so, from the constant action of the contracted muscles of the back, increased by the extension of the body on a plane surface, compressing the vertebræ, particularly in those who are scrofulous. And should this be cavilled at, to account for the numbness of the lower extremities, it will only afford me a stronger reason for condemning such a position.

The effect of mechanical pressure upon a nerve, in benumbing the part which it supplies with its nervous influence, is known to every one. The man who sleeps upon his chair, with his arm hanging over the back of it, and who awakes with it benumbed, will tell you, that this numbness is from pressure upon the nerves, to relieve which, he will instantly change its position, rub it with his other hand, and move its different joints.

In every case of this kind, the power of the limb is in a degree weakened, or partially paralysed, and requires some time before it can be restored to its natural state. But, should the mechanical pressure be continued, and no means taken to restore to the limb its nervous power, such a limb would be, most assuredly, rendered useless. In this case, the pressure, it may be said, is directly applied to the nerves which supply the limb, and, therefore, the numbness induced self-evident—not more so than the paralysis of the lower limbs is, from pressure on the posterior sacral nerves.

The posterior sacral nerves are certainly of some importance in the motions of the inferior extremities, for they are distributed upon the muscles that move them. It is quite clear, therefore, that inasmuch as these nerves contribute to the motions of the limbs, in so much will these motions be weakened, when the influence of the nerves is destroyed by pressure.

Besides, the anterior sacral nerves, which are distributed more extensively upon the inferior extremities than the posterior, from that consent or sympathy so strongly marked throughout

the nervous system, will become affected, particularly, as we know them to have the same origin as the posterior, and to anastomose freely with them in the course of their distribution.

Such a lesion of nerves from consent, is well known to take place in the human body from various causes. The man who swallows an oxide of lead shall be seized with tormina of his bowels, and become paralysed in his extremities, by consent of the nerves; yet there is a less direct communication between the nerves which supply the extremities, and those which supply the bowels, than exists between the posterior and anterior sacral nerves, which have the same origin, and supply the same parts.

Moreover, the retention of the muscles of the extremities, themselves, so much without motion during the use of the horizontal or inclined plane, is favourable to the production of such a state of the limbs.

The loss of power of the extremities, from pressure on the sacral nerves, does not, from what I have seen, amount to complete paralysis, for the person can move them when lying down; yet of what avail is this, if they be rendered so

useless by it, as to defeat nature in the purposes of locomotion.

Upon the whole, then, I consider the horizontal or inclined PLANE to be as improper, and injudicious a means of treatment, as any now in use. For, in the first place, it increases the contraction of the muscles of the spine which has caused its contortion, by keeping them constantly in a state of organic contraction, and preventing in them the indispensable interchange of relaxation, which is a part of their function. Secondly, that, by favouring and increasing the contraction of the muscles of the spine, such a constant pressure is kept up upon the vertebræ as to increase any ulcerative inflammation of them, should it have previously existed, or produce it if it did not, particularly in one who is scrofulous. And, thirdly, that, by the constant mechanical pressure upon the sacral nerves, such a lesion of them will be produced as, in some instances, to occasion the loss of the locomotive power of the lower extremities, favoured by continued position.

Having concluded my observations upon crutches and reclining beds, I shall proceed to the consideration of the means which are exclu-

sively employed for the cure of the contorted spine; and the first which I shall notice is,

Mechanical Extension.—It would occupy too much time, and too great a space, to give all the different modes of extension, used for the cure of this deformity, a separate place in this little work; nor do I think it necessary, as they all act upon the same principle. I shall only mention, therefore, collars and neck-swings as a specimen, being those which are in most repute.

Collars.—I shall not trouble my readers with a description of the several varieties of this unlucky instrument, but confine myself to a general detail of it, and its mode of action.

The collar in general consists of a semi-lunar iron rim, which encircles the back of the pelvis, and rests upon the spines of the ilia, just over the anterior superior spinous processes by means of broad pads or cushions, which are prevented slipping from off the bones, by smaller ones, placed at the sides of them. Behind, there are four other cushions, which project downwards, so as to press upon those parts of the pelvis which are covered most with muscular flesh. In this manner, the dorsum of the pelvis may be said to

be incased, and grasped by the cushions, when extension is made, just as a rounded body is by the points of the fingers when we attempt to lift it.

From the centre of the rim, rises upwards, as high as the lowermost cervical vertebra, an iron rod, which in some collars admits of a rotatory motion. At the top of this rod there is placed transversely, an iron plate, which presses on the scapulae, and a contrivance, with a catch, to receive the notched extremity of the falciform rod which mounts over the head, and suspends it by means of an iron frame, called the head-piece, and straps which go under the chin, and across the occiput. The body is extended by means of the notched extremity of this falciform rod, and a small screw at the top of the head-piece. Some collars are worn under the clothes, and others above them; in which case they differ somewhat, as for instance, in the latter they do not press upon the shoulders. They are also of different weights. I have known some to weigh seven pounds.

Those who use the collar for the cure of the contorted spine, make use also of the neck-swing.

Indeed they always stretch the body in the latter, before they apply the former : on which account, it is but justice for me, in my description of these instruments, to follow the same order.

Neck-swing.—This is nothing but a common tackle and pully, such as we see used for hoisting goods from the hold of a ship, or from a cellar, with its power concealed from its being made of smaller dimensions, fixed in general to the ceiling, in the centre of a room ; the cord by which it is worked leading to the side.

When this instrument is used, the head-piece of the collar is strapped to the head of the patient, and hooked by the lowermost pully. The body is then raised from off the ground, or with the tips of the toes touching it. How long patients are in general stretched in this manner, I shall not pretend to say. I have known them, however, to be so for about half an hour, being occasionally let down to breathe. But whatever be the time allotted by those who make use of such rough means, whenever it has expired, they adjust the collar, put it on the back, and allow the patient to go at large, in this extended condition.

It will appear evident, from the brief descrip-

tion I have given of the above instruments, that they are not so much intended to take off the super-incumbent weight of the body, as for the purpose of keeping up a constant and forcible mechanical extension of the spine, with the view of removing the supposed curvatures in it; a torture best known to those who have been delusively led to their adoption.

The neck-swing, it will be seen, acts solely by the laws of gravitation, and with a force equal to the gravity of the body of the patient. On the contrary, the collar produces its effects upon the principles of mechanics, such as belong to the lever, and very well illustrated by that powerful instrument, commonly called, I believe, the box-screw, whose force is exerted between two moveable fulcra, the head and pelvis.

Any one acquainted with the law of gravitation, which I suppose never enters the mind of those who make use of the neck-swing, must know, that when the body is suspended by the head, the greatest gravitating force must fall upon the vertebræ of the neck, more especially the first, and that this force will be double and treble there, to what it is in the back and

loins, the parts for which it is intended. It will follow, therefore, that if the force shall be sufficient to remove a permanent curvature in the lower part of the spine, did it exist, from its being exerted two or three fold in the neck, it will be likely to destroy the tone of the ligaments and muscles of the vertebral joints in this part; so that the patient's head shall fall to one side, which I am informed has actually happened.

The collar, fixed upon the body in the manner I have mentioned, is directed to be worn during the day *: and for the purpose of giving it its full effect, the patient is desired to lie down frequently on the ground, and to balance herself in it upon her back; while the inclined plane, with the sliding board, which I have described, is occasionally used as a variety.

Such powerful extension, however, cannot be endured long at a time; those who wear the collar, therefore, are compelled from their sufferings to undo the strap which takes the chin. This unstrapping of the collar, for so it is called, is frequently practised, and as often as it is so, so often does the body sink down and resume its

* I have known it to be worn even during the night.

former condition; which circumstance, independent of the fallacy of the instrument's expected effects, is sufficient to shew the inadequacy of such a means: for whatever benefit the spine might receive by its continued extension for an hour or two, the effect of it would be at once done away, by the release of the body, in the manner mentioned, for half or even a quarter of an hour.

Whoever is acquainted with the structure of the spine must know, that any extending force applied to it must fall exclusively upon the connecting ligaments and muscles of the vertebral joints, while it can be of no service whatever to softened bones, and far less so to diseased bones; but in which case I have seen the collar applied.

The extending force, then, of the collar falling exclusively upon the connecting ligaments and muscles of the spine, its effects on these will be to destroy their tone and elasticity, and consequently to weaken the power of the latter of retaining the body erect. Hence it is, that all those who wear the collar feel pain and uneasiness in their backs when they are freed from its

extending power; and hence the reason also, that so many after having worn this instrument for a number of years, ineffectually, are unable to support themselves erect without it, even for a few minutes at a time, in consequence, as I have observed, of the tone and power of the muscles and ligaments of the spine having been destroyed by extension. But, independent of this pernicious effect of the collar upon the ligaments and muscles of the spine there are others attendant upon its use, which add, in no small degree, to the distress of the unfortunate sufferer, arising chiefly from pressure upon the pelvis and lower jaw, the two fulcra on which it acts.

Pressure made upon any part of the body, if considerable, will invariably inflame it, and produce ulceration, and more particularly so in one who is of an irritable habit. Thus it is then, that although all who wear the collar suffer in some degree from its pressure, many endure the greatest distress and misery.

In no instance have I ever seen that patient resignation to bodily suffering, which so peculiarly distinguishes the female sex when they throw themselves upon the mercy, and seek re-

lief at the hand of erring or ruthless man, so singularly displayed as under the use of these wretched instruments. I have seen the spines of the ilia galled to ulceration, nay, gorged with interstitial matter, the chin suppurating, and the very bones of the lower jaw on the point of exfoliating, disfiguring and distorting the features of the face; and all this patiently submitted to by the ill-fated sufferers, buoyed up with the delusive hope of being again restored to their wonted shape.

What an instance then have we here displayed, of the feelings which spinal deformity must excite in the minds of those poor unfortunate females who have become the victims of its ravages: thus for its cure, to endure with such calm and patient resignation a torture, the very mention of which would cause their hardy companion man, to shrink! And how strongly does it plead an excuse for the fostering care of a mother, and the anxious exertion of the child, to ward off such a grievous affliction, by any means that shall send forth the most transient gleam of hope for such a blessing; but of which they are too often deprived by their own error! And how appalling must it be to the feelings of

him who shall see all this torture endured from an instrument, whose action, he knows (as I do), shall defeat the very intention for which it is employed; employed to remove *curvatures* from the spine, which I have shewn to be its natural flexures changed only in their aspect by the rotation of the vertebræ which form them.

It has fortunately fallen to my lot to be an eye-witness to such dreadful sufferings, and such delusive treatment as I have mentioned. I say fortunately, because it has urged me to the investigation of this deformity, and contributed, therefore, to the discovery, I hope, of its true pathology contained in the present observations, which I hasten to submit to the opinion of the public, in order that it may yet save the female children of this country, if I may be allowed the expression, from a blight in their youth, which over anxiety about their figures, improper treatment, and fashion, have brought amongst them: an evil which is fast hastening to deprive them, when arrived at maturity, of that symmetry and elegance of form, which through succeeding ages has been England's boast, and the admiration of surrounding nations.

From what has been said, then, of mechanical extension, as a means of cure in the contorted spine, both as it regards its expected and consecutive effects upon the body, it must be seen how futile and pernicious a remedy it must be, in this complaint, in whatever way it shall be applied. As there is no curvature of the spinal column, there consequently can be no need of extension to remove it : and in every case, where it is applied, its effects only go to destroy the muscles and ligaments of the spine. It is on this account that we see those who have worn collars for many years, as crooked in their bodies as when they first resorted to them ; and it is on this account, also, that they will, in my opinion, continue so, under their use, until their hairs turn gray with years.

Issues.—Mr. Pott, when he published on the palsy of the lower limbs, in the year 1779, was undoubtedly the first who introduced issues as a remedy for the cure of diseased vertebræ to the notice of the profession ; and were they confined within the limits which he has assigned to them, they would still be a useful acquisition in the cure of spinal deformity. But it appears that

medical men have gone far beyond the limits of Mr. Pott; for they have indiscriminately applied, not only the means of cure proposed by this celebrated surgeon, but even his doctrines, to every species of spinal distortion. From such a misapplication as this, discredit has, consequently, been brought upon the remedy, and disrepute even upon its author.

When inflammation, as a primary disease, attacks any of the vertebræ, their ligaments and cartilages, threatening destruction to the bones, and consequent deformity of the spine, and more especially if such inflammation proceeds from scrofula, then issues, in conjunction with other means, proper in such cases, will undoubtedly be a useful remedy, and used exactly as its author recommends. But if the spine be contorted by the diseased contraction of its muscles, in the manner I have pointed out, which is the most frequent species of spinal deformity that we meet with, and what is commonly called LATERAL CURVATURE; then, in every such case, will issues, in my judgment, be improper. As no structural disease, as it has been shewn, is present in such cases, so there can be no need of issues to re-

remove it; and should it occur as a consequence of the contortion, still issues will not remove the cause. They will not remove muscular contraction, but in every instance, tend, in my opinion, to confirm it.

The muscles of the human body are known to glide upon each other, during their action within their respective sheaths (condensed cellular substance); and while they do so, they suffer no impediment to their motions from the integuments that cover them; but to which, should they be united by inflammation, in whatever way produced, then will their motions, in every such case, suffer restraint.

If an issue be inserted in any part of the body immediately over a muscle, as, for instance, in the arm or thigh, and shall, at the end of six months, or sooner, be allowed to heal, there will be left a deep indentation to mark its site; and if the limb be moved by the action of its muscles, there will be a dragging of the indented part of the skin, in the direction of the muscle's motion underneath, in consequence of the adhesion which has taken place between the muscle and cellular substance. This dragging of the indented part,

although of minor consideration, must, nevertheless, be admitted to be an impediment to the free action of the muscle. But should there be a chain of such issues inserted in the course of a muscle, five or six inches in length, then will the impediment to its motion be great ; and I doubt whether such a muscle would be able, under such circumstances, to fulfil properly the office assigned to it in the system. If such an impediment, then, as I have mentioned, shall be caused by issues to muscles in their healthy state, how much greater must this be when they are contracted by disease ; and how little must be the hope of their ever being restored, under such circumstances, to their natural actions.

Such, then, I consider to be the case with all those who have had issues inserted in their backs for the cure of spinal contortion. The long chain of issues which are frequently inserted in the course of the extensor muscles of the back, while they are shortened by diseased contraction, and the extensive adhesions which must be thereby produced between them and the integuments that cover them, must cause such an impediment, in every instance, to their relaxation, that I doubt

whether, in such cases, it be possible to restore them to their original state by any means whatever, unless they be freed from their attachments to the integuments.

I consider issues, then, to be, in every case of spinal contortion, an unmeaning and improper remedy. For, in the first place, there is no disease for which they can be required. Secondly, they cannot remove, in my opinion, muscular contraction, which is the existing cause of the complaint. And, thirdly, they will, in every instance, interfere with, nay, I would say, prevent the relaxation of the contracted muscles of the spine, from the adhesions which they invariably occasion between them, and the integuments which cover them.

Do not let it be supposed, however, because I am condemning issues in the contorted spine, that I object to their use in the curved spine, on account of the adhesions which they occasion between the muscles and integuments. In such cases, we shall do well to save life by issues, or any other means. As to the deformity, I am of opinion it will ever remain.

Carrying Weights on the Head.—This, although last, is not least, of the many extraordinary, and, in my judgment, pernicious modes of treatment, which have been recommended by medical men for the cure of spinal contortion.

The worthy gentleman, now no more, who is said to have first introduced this very singular and novel practice, was, at the time he did so, a practitioner of this far-famed city, Bath; and I have no doubt myself (indeed I have been told so) but the idea was borrowed by him, from the little sand-boys of this place, who carry their bags of sand upon their heads.

Certain it is that these boys are not crooked in their spines; if they were so, I should very much suspect that they would be obliged to follow some other employment, under the self persuasion, that the burthen of sand bags carried upon the head, would be as hurtful to the crooked body of a little sand-boy, as a loaded footstool, borne in the same way, ever will be to the contorted spine of a boarding-school Miss.

This exemption from distortion of the spine is not confined to sand-boys; but, say others, “ex-

tends to negro women, and basket women, who, from early life, are accustomed to carry heavy burthens on their heads.”

Now, I have seen all these different classes of people, and many more, both men, women and children, and I never knew any of them yet (and probably the same may be known to others), whenever their backs ached from the burthen they carried, that did not take it from off their heads, and sit down to rest themselves; and on doing so, that did not also seek to sit upon some low seat, bend forward the body, and relax their wearied and contracted muscles; and that, when refreshed by this wholesome and necessary relaxation of their muscles, did not resume their load with *increased vigour*, and go their way. Need I make a comment on this? or only ask the reader what it was that afforded relief, in this case, to their oppressed spines, invigorated their bodies, and enabled them to resume their burthen? was it the contraction of the spinal muscles, produced by the ponderous load they carried on their heads? or the relaxation of them, while they sat down on their humble seat? The answer, I think, to this question, is as plain as it is simple; and I would

moreover say, that, should any of these poor labouring people be as much deprived of this wholesome, grateful, and natural relaxation of the muscles of their backs, as our fashionable children are now, during a ten years' education, they would become as crooked in their spines, and as deformed in their bodies as any one of them, even although they should continue to bear their burthen, or be released from its oppression.

Let it not be supposed, however, because I am condemning the practice of carrying weights upon the head in cases of the contorted spine, that I am despising it altogether as unworthy of notice; for I consider that we have yet a useful lesson to learn, for the prevention of spinal contortion, even in the habits of the little sand-boy. Not that lesson, however, which Mr. Grant learnt; to impose upon our delicate females what necessity, for a scanty subsistence, imposes upon these little labourers, but the means which nature instinctively tells them they must adopt to support their burthen,—to sit down and bend forward the body frequently and daily, and relax their spinal muscles.

Surely, then, we need not dive into the arcana

of nature, to seek for the cause of spinal contortion ; nor be so puzzled respecting modes of prevention, when it is, in so simple a lesson, clearly taught us by a little sand-boy. The same means which nature instinctively points out to be necessary in him, to prevent his spine from becoming contorted, while he bears up under the burthen of his labours, will assuredly not fail to be as effectual in warding off the evil from a delicate female, although she be doomed by nature to support the “overwhelming burthen” of a head and shoulders.

Let this simple lesson of nature then, to prevent spinal contortion in the little sand-boy, when we are reminded of it by his constant cry without doors, be learnt and practised by the little girl within ; and lest she should not be perfect in her lesson, let the matron of the house she inhabits see her frequently repeat it ere the day shall close. And in places where there are no sand-boys to teach this salutary lesson, it may still be learnt from the negro, or the woman who carries a basket.

I would have cautiously avoided any comment upon the writings of Mr. Grant's great sup-

porter, had Mr. Wilson, in his printed lectures, not spoken in such strong terms of recommendation of carrying weights upon the head, as being a certain and efficacious means of curing spinal contortion: a practice, in my humble judgement, big with mischief to those on whom it is tried, and even militating against his own printed opinions.

Waving, then, my own opinions altogether respecting spinal contortion, I shall only notice some of Mr. Wilson's own doctrines.

'This gentleman, when speaking of incurvation of the spine being produced by rickets in the vertebræ, says, " When a bend has once been established, the super-incumbent weight is thrown upon that part now in an unfavourable form for bearing it, and this of course increases the curve. Whenever there is a tendency to deviate from the perpendicular, the curve will continue to increase, or an attempt to counteract it, by a curve in another part of the spine, and in an opposite direction, will take place. We thus find, that in rickets the spine is bent serpentively and laterally, resembling the italic *f*; and is not, as in caries of the vertebræ, bent suddenly and for-

wards: and we often meet with several of these lateral curves, from the attempts successively made to support the weight more favourably by counteraction."

It is quite evident in this paragraph, that Mr. Wilson considers weight, or the attempt made to support weight by counteraction, to increase, nay, to produce the several curvatures which he is of opinion exists in the spine. Could we have believed, then, that after making this declaration, he would, at no greater distance than the seventh succeeding page, have recommended an increase of that very super-incumbent weight for cure, which he directly tells us produces the curvatures? Yet such is the truth. But I must do him the justice to say, that this extraordinary means, although he approves of it, did not originate with himself, as will appear from his own words. Intelligent men have oftentimes been led by the opinions of others into error, although their own good sense might tell them afterwards that they had been misguided, yet sixteen years is a long time to continue in a misconception on any subject.

"I here beg leave," says Mr. Wilson, "to acknowledge my obligations to Mr. Grant of

Bath, for the first hints I received of curing this affection of the spine by the regular and uniform action of the muscles belonging to it, and for a kind detail of his opinions on the subject. In an accidental conversation, he informed me, that he proposed to cure the lateral incurvation of the spine by placing a weight on the head of the patient, on the principle of producing frequent and equal action of the vertebral muscles; but that he seldom could convince either the mothers, or even the medical men whom he had met in consultation, that by this weight he should succeed in effecting his object. His practice immediately struck me as founded on just physiological principles, and I told him that I had then a favourable opportunity of beginning a trial of it. On that very day I begun the trial, and the event, in three weeks, exceeded my most sanguine expectations of success. Several years have passed since my conversation with Mr. Grant, but I have tried the plan in very many instances during the last sixteen years; and in no one, where it was properly persevered in, have I found it to fail in preventing the further progress of the disease, and in many I have wit-

nessed it effecting a perfect cure, at least so perfect that no deformity was perceived nor inconvenience in other respects suffered.

“The simplicity of the means of cure I have, however, found in some patients and their friends, to operate against a fair and sufficiently long trial of the plan being given. Some benefit has been received at first, they have been contented, and have not persevered longer than to arrest the progress of the disease ; the disease has once more gained ground, but on returning to the plan, and persevering in it, a cure has been effected. It is, therefore, necessary, that the principle of the cure should be understood by the patient and her friends.

“This principle I have found to be soonest made intelligible to those who are not anatomists, by the following illustration, viz. if a finger is held up, and bent a little, a weight being placed on its tip, either will bend it completely, or oblige it to straighten itself, so as to enable it to bear the weight when applied to it perpendicularly. Thus, the spine being bent in one or more directions, when a weight is added to the head, it directly, and almost instinctively, by the actions

of its muscles, straightens itself to bear that weight; and this action often renewed, and persevered in for a moderate time, will recover the spine from the bend that otherwise must have increased.

“The weight,” continues Mr. Wilson, “may be used in the manner following: a small footstool, covered with a flat cushion, being inverted, may be placed on the patient’s head, the hollow between the feet of the stool will allow of some substance, varying between four and ten pounds, in weight, for it may be necessary to increase it to the last amount, although much less is generally sufficient to be placed in it; the patient should be instructed to raise this with both arms, and support it on the crown of her head, elevating the spine at the same time towards the stool, while held over the head; she then preserving the most erect attitude she can, should walk in a straight line, as soldiers are taught to march, and for a time not exceeding ten minutes: this should be repeated occasionally during the day. By degrees she will learn to balance the weight, and this occasional exertion, giving the muscles their true action, will straight-

en the spine much more effectually, and sooner than any mechanical instruments.

“The patient should be frequently reminded by her attendants to sit upright, and the momentary attempt to do this, even if the attitude cannot be long persevered in, will prove useful in forwarding the recovery.”

These appear to me to be the most material opinions and suggestions of Mr. Wilson, respecting this extraordinary practice for the cure of the contorted spine, and the comment I shall make upon them shall be very brief, reasoning still upon his own principles.

First then ; if the vertebræ, softened by rickets, shall yield to superincumbent weight so as to curve the spine, and if the counteraction to bear such weight more favourably, shall increase this curvature, or produce others, I contend upon every known principle, that any additional increase made to this superincumbent weight, will, both as to cause and effect, be equal to such increase ; and therefore, that the very opposite effect must of necessity be produced upon the curvatures of the spine, to that which Mr. Wilson

has led us to believe takes place, when a weight is placed upon the head.

Secondly, the principle on which the cure is proposed to be conducted by Mr. Grant, that is, of producing frequent and equal action of the vertebral muscles, or, according to Mr. Wilson, of giving the muscles their true action, is physiologically correct; but the manner of obtaining this, I deem practically wrong. I must here make an assumption, and suppose that Mr. Grant and Mr. Wilson both mean the same thing; that is, to produce the natural action of all the muscles of the spine. Now the only way to obtain this, agreeably to the laws of the animal economy, is to produce in the muscles their natural function, which is alternate contraction and relaxation; for no muscle, in my opinion, can be said to effect its "true action" while it is kept either in a constant state of contraction, or remains quiescent in a state of relaxation, as both are known to be injurious to it. The constant and strong contraction, therefore, produced in the spinal muscles, necessary to support a loaded footstool on the head, cannot be considered their true ac-

tion, for it is but one part only of their function, the other being wholly disregarded, as appears from Mr. Wilson's injunctions afterwards, namely, that the patient should be frequently reminded by her attendants to sit upright.

Thirdly, The mode to which Mr. Wilson resorts to shew the principle of the cure may be to those, who, he says, are not acquainted with anatomy feasible enough; but I am of opinion it would puzzle one who is, to understand it. I can very easily understand, that if a man bends his finger in its natural and healthy condition, and a weight be placed upon its tip, that he shall be able to straighten it again and raise the weight; just as a man, woman, or child would be able to straighten the body, were it bent and loaded like the finger. Basket-women, unassisted, sometimes have recourse to this expedient to take up their load upon their head: they place the edge of their basket upon some convenient height, bend down their bodies, place their head underneath it, and so take it up upon their head by raising their bodies to the erect position. But when the bones of a man's fingers, legs, or spine shall be crooked, curved,

or otherwise bent by rickets, then will all the efforts he is master of, by aid of his muscles and assisted by weights, prove, in my humble opinion, wholly abortive in straightening either of these one hundredth part of a line ; and it would be impossible for any one, I apprehend, with his fingers so deformed, to demonstrate the principle of Mr. Wilson.

Lastly, As to the efficacy of the means ; all I can say is that I have, at present, a young lady under my care, who about ten years ago was as straight as most children are when they are sent to boarding-schools ; but who, soon after her admission into the school, shewed symptoms of contortion of the spine, and upon whom, under the direction of intelligent medical men, weights were tried with a scrupulous adherence to the injunctions laid down by their author, and under his immediate inspection, but who became extremely and miserably contorted in her spine and deformed in her body by the time she came under my care, eighteen months ago. The projection of the right shoulder behind was monstrous in the extreme, the hollow in the left side was equally great, the sternal extremities of the left

ribs were pushed forwards into a projecting ridge, the right scapula was thrown down from off the back upon the side of the body, and the head of the humerus was hooked down towards the chest, while the left scapula occupied the centre of the back. The right clavicle had sunk down below the level of its fellow, and the head and neck were carried towards the left side of the body, while the pelvis was so much twisted as to cause a lengthening of the right leg and an awkwardness in her gait.

Such extreme deformity was not likely to be borne with impunity to health. This young lady, consequently, suffered all the pangs of a broken constitution: head-aches, pains of the stomach, indigestion, pains of the chest, palpitation, hæmoptysis, and other evils betokening consumption, with extreme emaciation of muscular flesh, had all in turn been her companions during the progress of her deformity. Such a case, in common practice, would no doubt be deemed irremediable, and probably means had recourse to, only to palliate her sufferings. Yet I am happy to say, that so far advanced is the progress to-

wards the perfect recovery of this patient, that the projection of the ribs, both behind and before, are reduced to one-fourth their original size ; while the hollow in her left side has decreased in a relative proportion. The scapulæ have consequently changed, much from their altered situations, and the head of the humerus is no longer hooked down upon the chest. The clavicles will bear a minute inspection as to equality ; while the twisting of the head, neck, and pelvis are scarcely to be perceived. But what marks this change more strongly is, the restoration of health and strength. The muscles of the body have grown in size and resumed their natural and healthy appearance, and the non-naturals are in the most perfect state of healthy action. She knows now neither ache nor pain, but enjoys the present hours, under the cheering hope that she shall be again restored to her natural form, of which she has, for ten years of her life, been deprived, and to the enjoyment also of social life to which, from her deformity, she has hitherto been a stranger. A change so fortunate as the above, could in reason scarcely

be expected in the short time of eighteen months from her extreme deformity: indeed it has much surpassed my most sanguine expectations. But such is the truth; and it has been effected solely and simply by relaxing the contracted muscles of her distorted body, in the manner to be presently described.

Reasoning now upon the pathological principles which I have advanced in the course of these observations, it must be plainly seen, I think, that the carrying of a weight upon the head must be, in every case of contorted spine, injurious in the extreme. Muscles which, from their constant action in supporting even the natural burthen of the body erect, have become so contracted as to produce a deviation of the spine from its natural situation, are little calculated to support the additional weight of a loaded footstool when it is placed upon the head. By such a weight being placed upon the head, the muscles of the spine must be excited to stronger action to support it, and consequently, to stronger contraction, and as they cannot, under such circumstances, be, in the smallest degree, allowed the interchange of

relaxation, so they cannot be said to perform their natural and true action. To excite stronger contraction in muscles which have become already contracted and wasted by over-action, and not to allow to them their natural relaxation, must certainly be considered a powerful agent in increasing their contracted condition, and, consequently, improper in the cure of spinal contortion. But, as I have shewn that there are no curvatures in the spine, and that the appearances which are considered such are only a changed aspect of its natural flexures, so a weight carried upon the head, were it for no other reason than this, must be quite unnecessary in the cure, for it was originally intended to remove an imaginary evil. It may be said that this reasoning does not militate against the practice, for, as it was only intended to remove 'curvatures' from the spine dependent on rickets, so it cannot be expected to remove contortion in which I have stated there are none. Be it so; but I think I have said enough on this head to convince any one of the impracticability of its effecting, even in this case, any change upon the spine, except it be to increase its deformity.

Having premised these remarks upon the different modes of practice now in use for the cure of spinal contortion, I shall proceed to shew the manner in which I myself treat it, agreeably to the pathological principles I have laid down; and, in conformity likewise to what I have already stated, that, as contortion of the spine has been accounted for purely on the principle of muscular contraction, so must the cure be conducted solely on that of muscular relaxation.

For this purpose, then, I have recourse to FRICTION, MANIPULATION, POSITION, and EXERCISE. On each of these, I shall beg to say a few words before I explain the manner in which I use them.

Friction.—This remedy has been used in all ages, and for various purposes, but in what manner it acts upon the animal fibre, does not appear to me to have been satisfactorily explained. Certain it is, however, under whatever circumstances it is used, that it has a tendency to restore the parts to which it is applied, when they are diseased, to their healthy action. With this assurance, then, we must alone content ourselves, for we cannot, upon any *fixed* principle, I think, explain why it should increase the contractile power

of the muscles of a paralysed limb, and diminish it in those of a stiffened one, yet it is known to do both; nor why it should promote the absorption of an extravasated fluid, or a tumour of firmer consistence, and increase the size of a wasted muscle.

Friction is applied differently by different people, but, I think, the mode of its application ought rather to be suited to the particular disease for which it is used, than to any particular fancy of the person who orders it. For example, the feeble hand of an old woman, which is cautiously drawn over the tender surface of a gouty limb, is not at all calculated to overcome the contraction of muscles so powerful as to twist round the spinal column. Friction applied in such a manner, in cases of the contorted spine, would be wholly useless.

In all cases, then, of contortion of the spine, the friction necessary to overcome the contraction of the spinal muscles, and those of the trunk of the body, must be of such a nature as to act upon their remotest fibres; if it does not, the patient, as well as the operator, had better save himself the trouble of going through the mo-

tions; for, be assured, it will avail nothing in the cure.

Irritation of the skin is a consequence which so generally follows the use of friction, that many substances are employed to moderate or prevent it; and in this consists a good deal of the art. I have tried many, but I have found nothing to prevent it so effectually, in the strong frictions necessary for spinal contortion, as ANIMAL OIL. Vegetable oil (from the acid it contains, probably), I think, hardens the cuticle, and makes it both unpleasant to the operator and the person operated on. The animal oil, which I am in the habit of using, is the NEAT'S-FOOT.

Early impressions, for the most part, remain with us through life; and it is on this account that the impression which I had when young, that oils and ointments which were coloured with the *Anchusa Tinctoria* root, were less liable to become rancid from keeping, than those which were not, still remains with me; and I am yet inclined to think there is some truth in the observation, although I cannot explain it. But whether I may be correct in my conjecture or no, certain it is, that I colour the oil, by means

of this root, with the above intention, and I find it to answer the purpose; adding, at the same time (which may also contribute to its preservation), a little of the *Ol. Coci Butyraceæ*, in the proportion of half an ounce to a pint of the oil, to cover the heavy smell it generally possesses. With this oil, so prepared, I employ the frictions; and, whatever be the force necessary to overcome the contraction of the muscles of the spine, it is never followed by any cuticular irritation whatever.

Manipulation.—This has been long used in the surgical art, for the replacement of displaced bones; and for this purpose I use it in the contorted spine.

It cannot be supposed, that upon relaxing the contracted muscles of the spine by frictions, the vertebræ will rise of their own accord, from their new, and resume their former, or natural situations. Any one who is acquainted with the anatomy of the spine and its muscles, must know that very many of the latter cannot be reached (or very slightly so) by any frictions we can apply; and therefore, that unless they be acted upon, in some manner or other, they will remain

as so many impediments to the restoration of the vertebræ to their natural situations. It is for the purpose, then, of supplying the defect of friction to such muscles as we cannot reach, together with the endeavour to return the displaced vertebræ to their natural situations, that I make use of manipulation; and as I always employ it at the same time that I use friction, so I would consider it only a species of this, or, if you please, an auxiliary.

Position.—I have said so much against position in the contorted spine, that my readers may think it does not become me now to enter it on the list of the means which I use myself for the cure; yet, however paradoxical it may appear, I certainly have: but it must be remembered, that there is with position, as with most other things, a right and a wrong; and as I have already pointed out what I consider to be the bad, I shall now offer, in its place, what I conceive to be the good position.

I hold it to be an axiom in physic, as well as surgery, that to cure a disease, is to remove the cause. As spinal contortion, then, depends upon the continued extension of the body, and the

contraction of the spinal muscles thereby produced, so, therefore, this being the cause, it must be removed before we can possibly cure the contortion. Now, there is no way with which I am acquainted, of doing this so effectually, as by bending forward the body, and relaxing the spinal muscles : so, therefore, after frictions, I place my patients on their backs upon a concave elastic couch, on which there is placed a mattress, two, or two and a half inches thick.

I have shewn, that the whole human species, when they lie down to rest, are instinctively led to assume the position which approaches to that in which they lay while *in utero*, stating it, likewise, to be my belief, that it was the position, of all others, which allowed the relaxation of the greatest number of muscles : from which it will appear, I think, that when I place my patients on their backs upon a concave couch, I am only following, in reason, what nature points out by instinct. But as nature also instinctively leads us to change our position frequently, so, likewise, the couch is made to admit of such a change, which will be seen in the description of it. And further, as we are also instinctively led,

after we have relaxed our muscles by lying down, to rise up and exercise them, so, likewise, I make my patients get up frequently from their couches, and do the same.

Exercise.—So much has been said from remote ages, and by such able men, on the utility and necessity of exercise in preserving, as well as restoring the health of the human body, that nothing remains for me on this subject, but the consideration of the proper mode of its application, and to urge its use for the restoration of the spinal column to its natural form, when it has become contorted by the contraction of its muscles.

If a medical man shall be called to see a patient whose limbs are stiffened and distorted by the contraction of their muscles, either as the consequence of disease, inaction, or mal-position, the advice, in all probability, which he would give for their restoration, would be to apply friction, and make use of daily exercise. Waving the consideration of the former, let us attend to the latter.

For a patient with his limbs so affected, the exercise which doubtless would be ordered, would

be walking on foot, or something similar to it ; for if it were any other kind, I doubt whether it would answer the purpose of restoring to the patient the use of his legs again. It being taken for granted, then, that the exercise ordered is walking on foot, let us inquire what takes place during its operation.

If a man who is in perfect health, and who has the proper use of his limbs shall walk a mile, he shall in this distance (reckoning for the sake of explanation, a yard to each pace) have made 1760 flexions and extensions or motions of his limbs, being tantamount to as many contractions and relaxations of their muscles ; which being divided by two, the number of his limbs, will give to each limb 880. But as it cannot be expected that the patient who is ordered to walk for his recovery, shall, with his stiffened limbs, get over the ground like the man who has the free use of them, we may in round numbers, take it for granted, that he shall make as many flexions and extensions of his limbs, or contractions and relaxations of their muscles (such as they are), in half the distance ; and although he may have found a difficulty in accomplishing this task,

yet in the opinion of such medical adviser, it would no doubt, be considered moderate, and he would, in all probability, urge his patient to increase the distance gradually, until he should, through the effects of the exercise in restoring to him the use of his legs, be able to walk a dozen miles. And should he be so fortunate (taking it for granted that his limbs are now restored to their natural condition), he would, according to the former calculation, make no less than 21,120 flexions and extensions, or motions of his limbs, or as many contractions and relaxations of their muscles, being 10,560 to each limb.

Now it is exactly the same kind of exercise that such a patient as I have described, is ordered to make use of for his stiffened and distorted limbs, that is necessary for curing a contorted spine; for, like the limbs of the patient mentioned, it depends upon the contraction of the muscles that move its joints occasioned by position. So, therefore, the exercise that I order for the cure of the contorted spine, is flexion and extension of the body, or, in other words, alternate relaxation and contraction of the spinal muscles; and the manner of applying it is by means of the simple contrivance to be described.

REFERENCES TO THE FIGURES.

FIG. 1.

Represents an elastic relaxing couch for an adult.

A A A A. The frame, whose height is two feet three inches ; width, two feet two inches ; and length, six feet six inches, or seven feet. B, A moveable roller, with a small wheel and catch at *a*, which is turned by the handle C. at *b*. D D D. Thin laths of wood, two inches broad, slung by means of hanks of small twine, *c c c c* and fastened by straps to the rollers B. E.

F F F F F. Posts with tester, which screw into the frame at A A A A.

The object to be obtained from the use of this couch, is rest, combined with relaxation of the spinal muscles, and change of position.

When it is used, there is placed upon the laths a hair mattress, two, or two inches and a half thick, on which the patient lies down upon her back, and the position of the body is altered by turning round the roller B at the end of the couch to which the laths are strapped.

The posts and tester shewn by the dotted lines, are only for convenience, should it be wished to convert the couch into a bed at night. In this case it is to be made after the manner of a common bed, with pillows, &c. During the day the posts are unscrewed and laid aside.

FIG. 2.

Represents the friction bed, whose height is two feet two inches ; width, two feet two inches ; and length, six feet.

A. A small soft cushion, to rest the chin upon.

A mattress is placed upon this bed, when it is used, covered

FIG. 1.

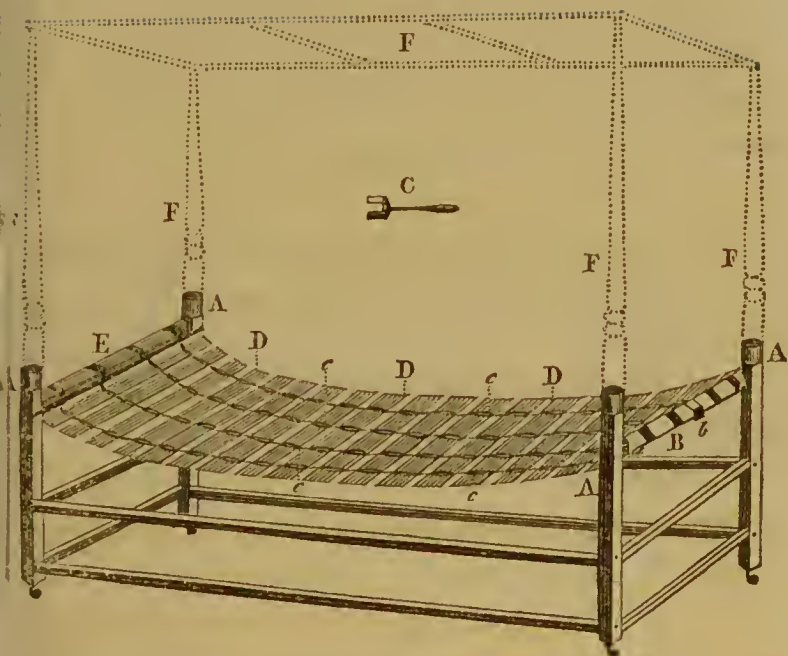
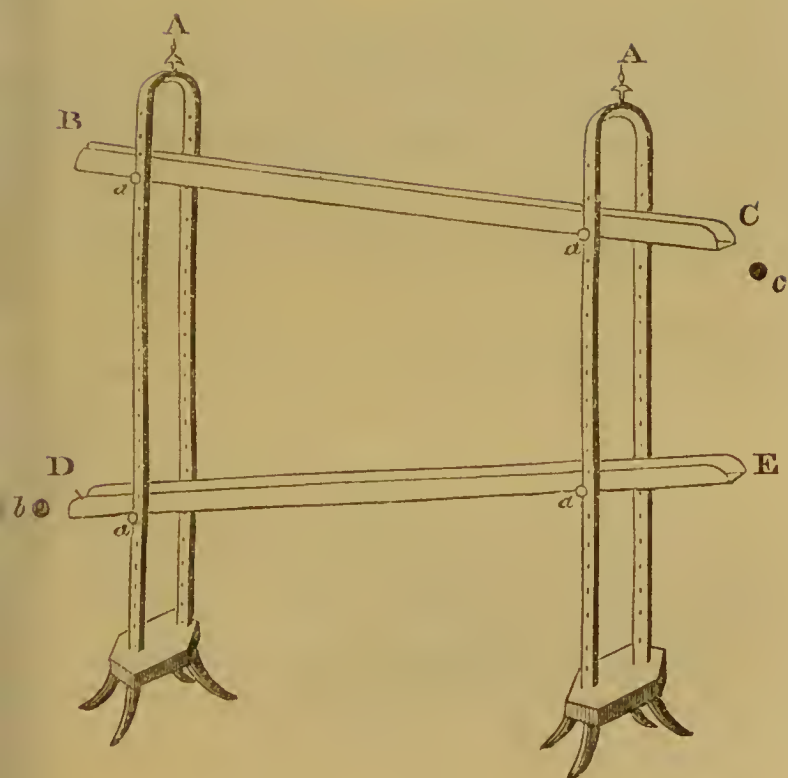


FIG. 2.



FIG. 3.



with a coarse cloth to prevent its being soiled. The patient lies down upon this mattress on the face, and rests the chin upon the small cushion at the end of the couch, while the frictions are applied.

FIG. 3.

A A. Two graduated stands, whose height is five feet six inches.

B C D E. Two shoots, five feet long, and three inches wide, supported by iron pins, *a a a a*.

b c. Two balls made of light wood, one inch and a half in diameter, covered with leather.

The mode of using exercise by means of the above described frame is as follows :—

The patient stands at the end where the shoots diverge, and an attendant at the other. The patient then bends the body forwards to receive, with both hands, the ball *b*. from the shoot D E. while the attendant receives the other ball *c*. from the shoot B E. The patient then raises the body to the erect position, and, with both hands, throws the ball gently into the shoot B C. While the attendant drops the other ball into the shoot D E. to be again caught by the patient at D.

It will be seen that the object to be obtained by this contrivance is the flexion and extension of the spine or the alternate contraction and relaxation of its muscles; and as the upright stands are pierced by a number of holes, the extent of the flexion of the body may be regulated at pleasure according to the circumstances of the case, by raising or lowering the undermost shoot at its extremity D. and shifting the iron pin which supports it.

Having briefly considered the different means which I employ for the cure of the contorted spine, I shall now proceed to shew their mode of application.

My patients being provided with, and dressed in flannel dressing gowns, open to the back, and petticoats, I desire them to lie down upon their faces on the friction bed, in the manner described. I then besmear the back well with the prepared oil mentioned, and make use of strong frictions to all the muscles of the spine, but particularly to those which are most contracted; and at the same time I use manipulation, at intervals, to the displaced bones. This process I continue about twenty minutes or half an hour at a time, and repeat it twice, and in some cases, three times a week. If the friction be applied in the evening, the patients are desired to go immediately to bed, in which I order them to lie for some time on their backs, with their heads and shoulders raised a little, and their bodies gently bent, in order that the muscles of the spine may be kept in a state of relaxation, which such a position of the body admits of, and which is quite agreeably to nature's laws. If the fric-

tion be applied during the day, instead of sending my patients to bed, I desire them to lie down upon their backs upon the relaxing couch, for an hour or so before they dress themselves, and afterwards to resume the couch. This couch they continue to occupy daily, instead of sitting up upon a chair. But as I do not confine my patients constantly to this position, so I direct that they get up frequently, and exercise the muscles of their spines for a quarter of an hour, or twenty minutes at a time, by means of the shoot and balls described, and to resume their couch again immediately after the exercise. I allow my patients likewise to rise to their several meals, and to seat themselves in a chair, such as I have recommended; but if it pleases them to have one with arms, I have no objection to it. I do not allow them, however, to sit up more than half an hour at each meal, when they again return to their couches.

This is the manner, then, in which I conduct the cure of the contorted spine, which, it may be observed, is strictly upon the principle of muscular relaxation; and however simple it may seem, yet there are several circumstances in each

of the means recommended, that it is necessary in particular to attend to, and which I shall beg to notice, taking them in the same order that I have mentioned them.

First. Whoever shall expect to benefit a patient afflicted with spinal contortion by the application of friction, that is to say, the person who shall apply it, must of necessity understand not only the anatomy, and relative situations and connexions of the bones and muscles which compose the trunk of the body in their natural and healthy state ; but he must likewise understand the morbid anatomy of them in their altered condition : if he does not, it is not likely that the patient shall receive the smallest service from his operations ; because he may in this case apply too much friction to such muscles as do not require it, and omit it in those which require it most ; consequently, the situation of the bones will remain unchanged.

Suppose then, we are to use friction to one, the vertebræ of whose spine are rotated to the right side, the muscles which we shall find to require the most relaxation will be, generally speaking, those of the left side of the body, and parti-

cularly the longissimus dorsi, sacro-lumbalis, and quadratus lumborum. This last mentioned muscle will always be found to be powerfully contracted. The above I consider to be the principle muscles that contort the spine, but as all those which contribute to rotate the vertebræ are concerned, I conceive in some degree, in producing the contortion, so they will be found to require more particularly the application of the friction.

But independent of the muscles that rotate the vertebræ, many others of the trunk of the body become contracted, from the altered position of the bones to which they are attached, and particularly the scapulary. And when the uppermost dorsal vertebra is rotated, those of the neck are made to participate. It will be necessary therefore to search for such of these muscles as are contracted, and to relax them. We must direct our attention likewise to the pectoral muscles, which, as I have already stated, will be frequently found much contracted, and be a powerful opponent, consequently, to the replacement of the scapula.

The manner in which the friction must be ap-

plied to the contracted muscles, is chiefly by means of the thumbs and points of the fingers, the broad palm or surface of the hand availing nothing in relaxing their contracted fibres; and the direction must be longitudinally as also transversely.

Whilst we direct our attention in a more especial manner to the relaxation of the contracted muscles of the left side of the body, we must at the same time, by gentler frictions, stimulate those of the right side; for it will be found, that inasmuch as those on the left side have become contracted, and rotated the vertebræ, so much will those on the right side have lost their contractile power from the altered position of the bones to which they are attached having changed their line of action.

When contortion takes place to the left side the same directions as I have given with respect to the muscles of the left side of the body, will be applicable to those of the right.

Secondly. In considering the circumstances more particularly to be attended to in the use of manipulation as a means of cure in the contorted spine, the same holds good with it as does with

friction, with respect to the necessity of the person who makes use of it, possessing a requisite knowledge of the anatomy and relative situation of the parts concerned in the deformity both in their natural and altered condition; without which he cannot expect to benefit his patient, but be likely to do irreparable mischief.

In making use of manipulation, we must ask ourselves what the object is we wish to obtain by it, and when we do so, we must inquire into the relative situations of the bones of the spine and trunk of the body of the distorted person, dragged now into unnatural positions by their contracted muscles. We have in the first place, then, the vertebræ of the whole or part of the column rotated upon each other, in a degree, or to the whole extent of their rotatory motion. We have by this changed position of the vertebræ, in the second place, the ribs on one side elevated and dragged backwards, and on the other depressed and pushed forwards. And thirdly, we have one scapula pushed down upon the side of the body, and the other dragged towards the centre of the back. Now it is to endeavour to return these different bones into their natural situations,

that with friction we are to make use of manipulation: and when we consider that the altered positions of the ribs and scapulæ depend upon the rotation of the vertebræ, so if we can replace these, the others will follow as a consequence. The manipulation, therefore, must be chiefly directed to the replacement of the vertebræ; and the levers to be acted upon for this purpose are, the spinous processes of those of the back, and the transverse processes of those of the loins.

I have observed that two cases of spinal contortion, in general, present themselves, and that they only differ in respect to the number of vertebræ rotated. In those cases of contortion, which are attended with the movement of all the vertebræ, the manipulation, as well as friction, must extend from the first vertebra of the neck to the lowermost of the column. Whereas, if the first dorsal vertebra remains in *sitû*, then must the manipulation be applied from this downwards.

I must here caution those who shall treat contorted patients in the manner I have recommended, by no means to make pressure upon the protruding ribs, with the view of replacing them;

for, if they attempt to do so, they will be more likely to increase the rotation, particularly of the lumbar vertebræ, than diminish it. The sole object, then, must be directed to the replacement of the vertebræ by means of the levers pointed out; and the force applied (which, in every case, should be gentle) must be so directed, as to give to the vertebræ a rotatory motion, contrary to that which has been produced by their contracted muscles.

Thirdly. Continued position of any part of the body I have shewn to be, in every instance, both painful and injurious to it. Our great object, then, in the use of position for the cure of the contorted spine, is to avoid, as much as possible, the constant observance of any one.

As I consider it highly injudicious to allow a contorted patient to continue, during the whole day, in the erect position, because of the constant action produced in the contracted muscles of the spine necessary for its observance; so I deem it as improper to lay one down upon a couch, which shall not admit of a change being made in it.

Although I direct my patients to rise up from their couches several times a day, and exercise

the muscles of their spines, yet they spend a considerable part of their time in the recumbent position. To avoid any injury then to the spinal muscles from this confinement, it is, that I have made the couch on which they lie to admit of being changed, and it will be seen from its construction, that the range of position is between a plane surface nearly, and a semi-ellipsis, whose short radius is fifteen inches. I seldom allow my patients, however, to lie in either of these extremes, but make the change somewhere between an ellipsis, whose short radius is four or five inches, and one whose radius is ten or twelve. But, in this particular, we are to be guided by circumstances; for a patient (for the reason to be explained when I come to speak of exercise) is not able to bear so great a curve in the couch at first as afterwards.

The patient, then, while she lies down on the couch, should have a change made in it frequently through the day, by increasing and diminishing, alternately, the concavity on which she lies; by which there will be a corresponding change produced in the contractions and relaxations of the spinal muscles, although she has made

no effort on her part to do so. This frequent change in the muscles of the spine, will not only prove a safeguard to them against the effects of continued position, but will materially contribute to their recovery.

As the patient's limbs will not escape injury if they be retained constantly extended, and as their flexion, I conceive, will not in the least interfere with the recovery of the spine, lest they should suffer, I order them to be bent upon the body frequently during the day.

Fourthly.—In considering what is more particularly to be attended to in the use of exercise for the cure of the contorted spine, we must first consider the manner in which it is directed to be used. It has been shewn that the contorted spine is produced by the contraction of the spinal muscles, in consequence of the trunk of the body having been retained too much in the extended position, and that the exercise recommended, is with the view to overcome this contraction of the muscles, by producing in them their natural function. As there is no way, therefore, of doing this, with which I am acquainted, except it be by the flexion and extension of the body, so it is the

manner in which I have desired the exercise to be taken.

The spine, we know, consists of many joints moved by many muscles, and in its natural and healthy state can be bent forwards to a considerable extent. In this motion its flexures are very materially changed, while the extensor muscles are freely relaxed for its accomplishment. When the extensor muscles, however, have become contracted, particularly those of one side, and the vertebræ changed from their natural situations, in the manner I have pointed out, there is then a material difference; for, in this case, when we bend the *body* forwards, the spine is bent laterally, inasmuch as the vertebræ are rotated; while the contracted muscles do not admit of free relaxation. Under these circumstances, then, if the patient should attempt to bend the body, beyond what the relaxation of the contracted muscles will admit, there will be an injurious dragging or stretching of them, and compression, likewise, of the vertebræ and their cartilages. To prevent this, therefore, we must direct that the flexion of the body be, *at first, always very gentle*, and to increase it gradually

as we gain upon the contracted muscles. I have, consequently, the stand of the shoot and balls graduated, as it has been shewn, so as to allow as much or as little flexion of the body, during the exercise, as the case may require, and in order that it may be increased or diminished at pleasure. It is on the above account, also, that it becomes improper to lay the patient down at first upon the couch, when it is much curved, as before alluded to. In cases of long standing, and where there is much contraction of the spinal muscles, I do not use exercise from the first, but endeavour to relax the muscles for some time previously, by means of friction and the relaxing couch, and then to urge its use. In incipient cases of contortion of the spine, especially in children, and while the body is still growing, together with the means recommended, I direct exercise to be taken in the open air; and in all cases of the complaint, other succedanea must be combined, that are known to be beneficial in preserving the general health, and invigorating the system.

In this manner, then, I conduct the cure of the contorted spine; and the success attendant

upon the practice fully justifies me in recommending it strongly to the notice of the profession.

Mr. Ward, I consider, deserves much praise, for having called the attention of the profession, by his late publication on Distortions of the Spine, &c., to the use of exercise for the cure of this distressing malady, which, in my opinion, if judiciously employed, will prove infinitely more successful for its removal, than any of the other modes of practice now in use. But as I have a feeling of horror about me, at the use of instruments and weights, in the treatment of diseases of the human body, arising, probably, from having seen so much of their injurious effects; I cannot reconcile myself to his mode of exercising the spinal muscles, and conceive it can be as effectually obtained, and with much less risk of injury to the patient, by the simple contrivance which I have invented, and given a description of. Besides, the strong functional contractions produced in the extensor muscles of the spine, necessary to raise any heavy body, is not, in my opinion, favourable to their recovery from their contracted condition; while the carrying of a

weight upon the head, which he speaks of as being useful in incipient cases, I hold to be a powerful agent in increasing the complaint, and, in my opinion, ought to be avoided by every one.

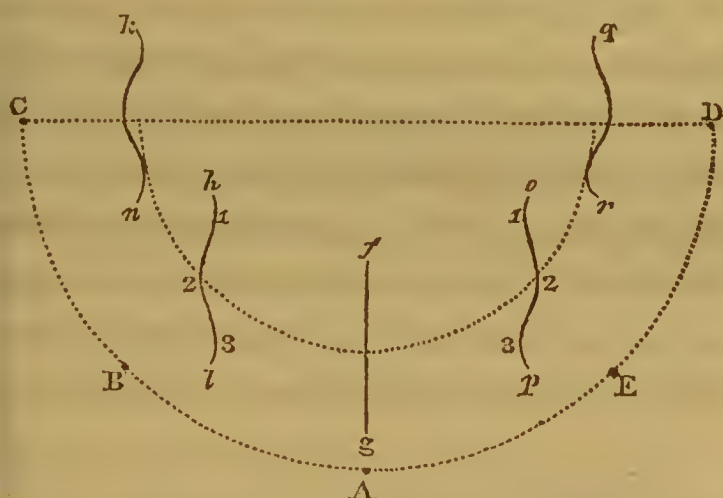
In concluding these observations, I shall beg to repeat, that I have drawn a perfect line of distinction between those distortions of the spine which are called LATERAL CURVATURES, and those which depend upon rickets, scrofula, or other diseases of the bony structure; and shewn that they are alone dependent upon, and produced by, contraction of the spinal muscles, brought on by mal-position in childhood.

It is quite evident, therefore, that the practice which I have recommended for the cure of this species of the complaint, in consequence of the distinction which I have made, is not, in the smallest degree, applicable to any other: nor can it be used *in toto* in those cases where disease of the vertebræ has occurred as a consequence of the contortion. From this circumstance, I shall reserve the consideration of this variety of the contorted spine to a future time.

PATHOLOGY, I conceive, is the first principle in the healing art ; for until we have a perfect knowledge of the causes, nature, and symptoms of a disease, we shall in every instance err in the application of our remedies for its cure.

The preceding observations, then, grounded upon practical experience—the surest of all foundations—were made with the view of establishing this principle in the lateral distortion of the spine, and I have given them now to the world for whose benefit they were expressly written. It will be seen in the course of them, that I have, in the first place, drawn a perfect line of distinction between that species of distortion, become now so prevalent, and those crookings and curvings of the spine which proceed from disease of the vertebræ, and shewn that it is produced by moral causes. Secondly, I have explained in what manner these causes act upon the spinal column ; that they disorganize its muscles, and

distort its joints within the spheres of their several motions. Thirdly, I have accounted for the lateral and opposite bendings of the spine which constitute the deformity, and about which so many hypothetical opinions have, in my judgment, been advanced, and disputes arisen amongst learned men, in the present as well as past ages, upon one of the most common and familiar principles in nature, namely, that an object becomes changed in its appearance from change of position, or by varying the point of sight, and, as applied to the spinal column in the present question, is demonstrated by the following diagram:



If the spinal column, in its natural position, be viewed from behind at the point of sight, A,

although it consists of three flexures, yet from these being directed to and from the eye, it will be seen as the straight or perpendicular line, *f g*. But if it be turned round upon its axis to the right an eighth part of a revolution, or be viewed from the point of sight, B, it will appear, from its flexures becoming lateral, as the lesser curved line, *o p*. (Although I consider this to be the greatest extent to which the spinal column is ever rotated in the living body, and what I have in the preceding observations called the profile, or rather semi-profile aspect of the column; yet I am of opinion, that it is seldom carried so far round, and that it is generally confined in its rotatory movement to different intermediate degrees between the lines, *f g* and *o p*, or the points of sight, A and B. Consequently, the lateral bendings observed in the spine will appear greater or less, according to the degree to which the column is rotated, and the extent of the natural flexures, 1 2 3*; as also to the increase of the flexures

* The reader can easily imagine, from the diagram, what a very small rotatory movement of the spine will suffice, to produce the appearances observed in an incipient case of lateral distortion.

which I have shewn is produced by the perpendicular forces of the contracted muscles. It must be remembered likewise, that as the spine is rotated *spirally*, and not as upon a pivot, the profile of its flexures will be imperfect.) And if the column were further rotated to one quarter of a revolution, or viewed from the point of sight, C, it would appear as the greater curved line, *q r*, and would be its perfect profile. On the other hand, if the spine be turned round upon its axis in a similar manner to the left, or be viewed from the points of sight, E and D, it will be seen as the lines, *h i* and *k n*, whose curvings, 1 2 3, although similar to those in the lines, *o p* and *q r*, it will be observed, are reversed. Lastly, I have grounded my practice strictly upon the pathological principles laid down, which is to relax the contracted muscles that I have shewn produce the deformity, by a combination of those means which experience has proved to be useful for this purpose, and to restore the bones to their natural situations.

I have been induced to give this further illustration of the pathology of the lateral distortion in the spine set forth in the preceding observ-

ations, in consequence of very different opinions on the subject having been published while this work was in the press ; but more especially as several of the means of cure, that have been at the same time recommended, are in direct opposition, it will be seen, to the principles I have laid down*.

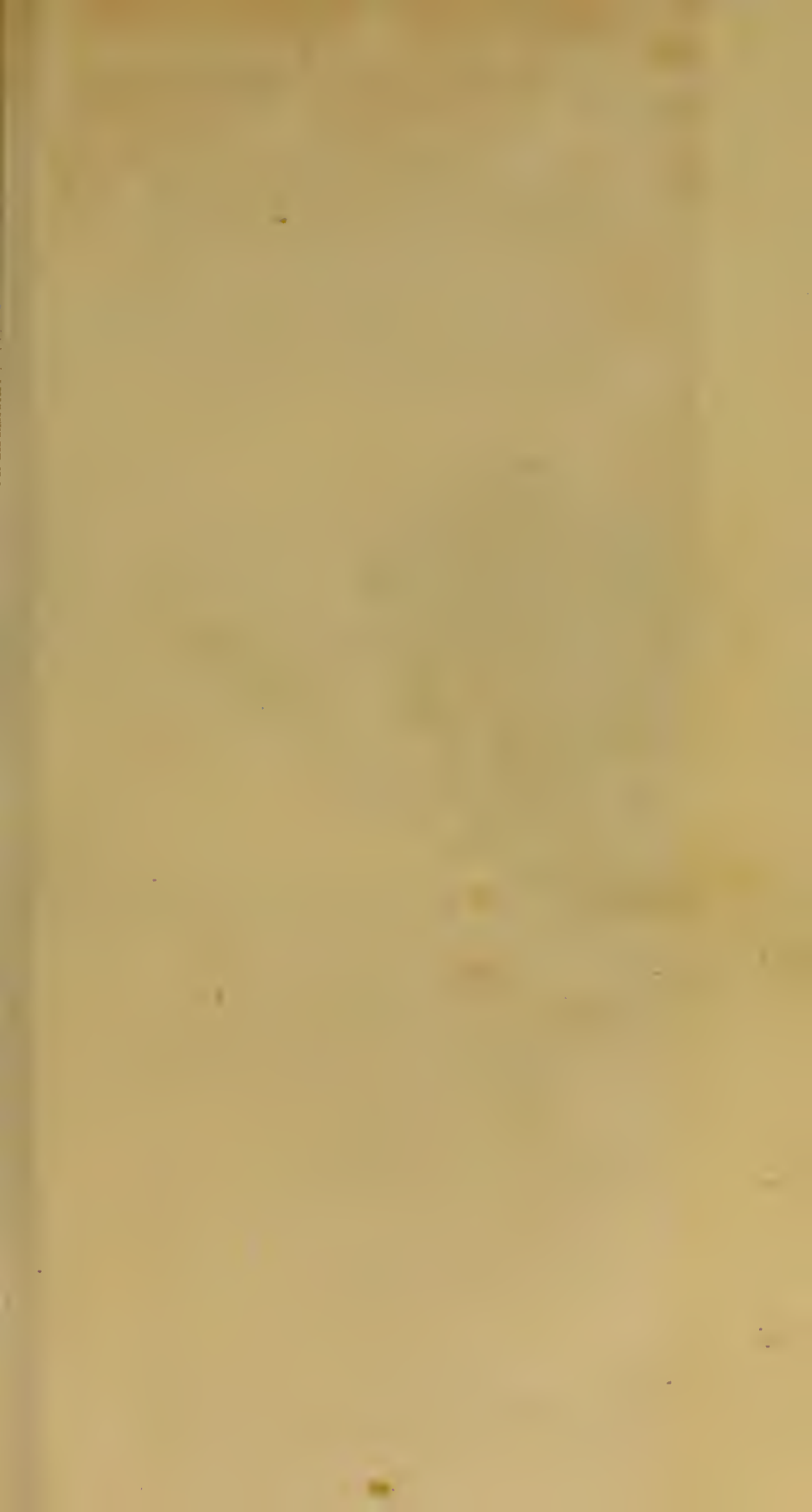
Had these opinions appeared at an earlier period, I should have probably been led, as I have been in regard to others, to have made some observations on them ; but, as they are strictly contemporary with my own, I shall forbear any comment.

It is to be lamented when difference of opinion arises, we so frequently, and perhaps naturally, are led to over-rate our own. I am by no means so self-confident, then, as to suppose myself exempt from this failing, or that it may not have influenced me on the present occasion, although I feel satisfied that I can demonstrate, in the living body, every thing I have advanced on the subject. It becomes, therefore, highly im-

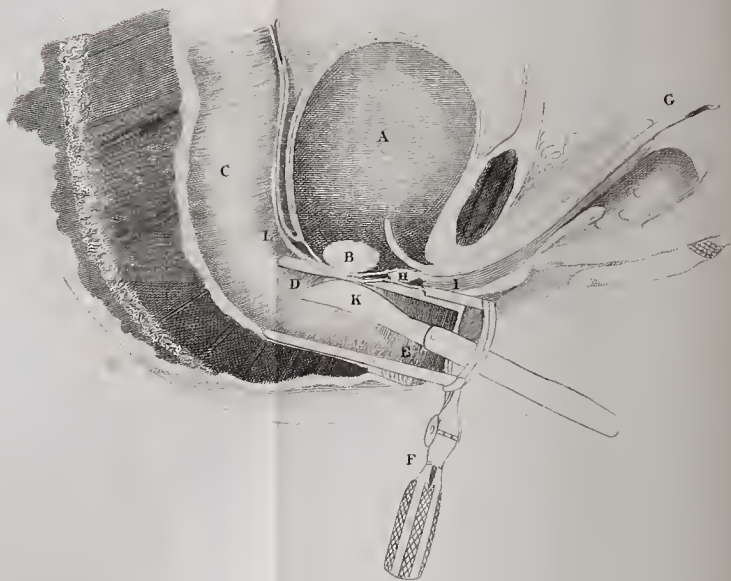
* See a work entitled, *On the Nature and Treatment of the Distortions to which the Spine and Bones of the Chest are subject*, by John Shaw.

important, I conceive, that the subject should be investigated by others. Let those, however, who shall prosecute the inquiry, be on their guard against hasty conclusions, and remember that the general welfare of mankind, as also that of their own families, are involved in the question; for, if they adopt, and act upon a false pathology, deformity of the spine will still continue to rear itself in the midst of them. Meanwhile, it becomes the province of those who, from their critical acumen, their acknowledged and superior judgment, hold the reins of medical practice, to decide upon the merits of conflicting opinions which are continually pouring forth respecting the diseases of mankind, and guide the bewildered practitioner amidst the labyrinths of error.

THE END.



*A Vertical Section of the Pelvis, exhibiting the
relative Situation of the parts concerned in the
POSTERIOR OPERATION OF LITHOTOMY:*



Drawn by my Pupil Mr. C. C. Eyre of Bristol